The Economic Impact of the Horse Industry in Virginia

MARCH 2011

TERANCE J. REPHANN
WELDON COOPER CENTER FOR PUBLIC SERVICE
UNIVERSITY OF VIRGINIA

THE ECONOMIC IMPACT OF THE HORSE INDUSTRY IN VIRGINIA

A STUDY PREPARED FOR THE VIRGINIA HORSE INDUSTRY BOARD

TERANCE J. REPHANN, Ph.D.

Center for Economic and Policy Studies
Weldon Cooper Center for Public Service
University of Virginia
March 8, 2011

Cover art provided by Xenophon Strategies

WELDON COOPER
CENTER FOR PUBLIC SERVICE
University of Virginia

P.O. Box 400206
Charlottesville, VA 22904
(434) 982-5522 • FAX: (434) 982-5524 • TDD: (434) 982-HEAR
Website: www.coopercenter.org/

Richmond
700 E. Franklin Street, Suite 700
Richmond, VA 23219-2328
(804) 371-0202 • FAX: (804) 371-0234 • TDD: (804) 982-HEAR

Southwest
One College Avenue
Wise, VA 24293
(276) 328-0133 • FAX: (276) 328-0233 • TDD (540) 328-0191

Southside
1008 South Main Street
Danville, VA 24541-4088
(434) 791-5174 • (434) 791-5175 • FAX: (434) 791-5176

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

PREFACE

The purpose of this research is to provide a comprehensive evaluation of the statewide economic impact of the horse industry on the commonwealth of Virginia. It should be understood that although the word "equine," which includes ponies, mules, donkeys, and burros as well as horses, would be a more accurate description of the industry, the term "horse" will be used here instead because it is more common and most of the animals involved are horses. The study relies on data drawn from numerous sources, including published data, information from research studies, and new primary data collection from surveys of horse industry participants. It uses standard regional economic tools to gauge the effect of spending of the varied industry participants on the Virginia economy. Participants include horse owners and operations (farms, breeders, boarding facilities), horse show and competition participants and spectators, and pari-mutuel racing patrons.

This study was commissioned by the Virginia Horse Industry Board, which was established in 1994 within the Virginia Department of Agriculture and Consumer Services for the purpose of promoting and developing the state's horse industry. Recognizing the need for timely information on the economic status and influence of this growing industry, the board approached the University of Virginia's Center for Economic and Policy Studies at the Weldon Cooper Center for Public Service about updating a statewide economic impact study conducted nearly eight years ago for the Virginia Equine Educational Foundation with financial support from the Virginia Horse Industry Board. This study implements the general methodology used in the earlier study. However, certain enhancements were made to improve data collection from industry participants. Moreover, a newer version of the regional economic model was employed. Lastly, this study provides additional economic information, including tax revenue estimates and impact estimates for each county and independent city.

In order to familiarize myself with the horse industry, I immersed myself in a review of the literature and consulted with colleagues and industry participants on different questions. I also visited venues and events described in the study, including a Thoroughbred race at Colonial Downs, the Cavalier Classic at Commonwealth Park in Culpeper, and the Southern States Showdown at the Virginia Horse Center in Lexington. These experiences helped to enhance my understanding of the industry.

I would like to thank numerous people for assistance in completing the study. Andrea Heid, Director of the Virginia Horse Industry Board, and members of the board (see the next page for member list) provided helpful guidance during all stages of the study, including defining the study scope, assisting with horse event sample selection issues, and providing survey cover letters. Mr. Herman Ellison of the National Agricultural Statistics Service's Richmond office provided unreported information from the 2006 Virginia Equine Survey Report that was important for conducting the impact analyses for horse operations. Former Virginia Racing Commission Victor Harrison provided useful information about Virginia's pari-mutuel horse racing industry. Darrell Wood, Director of Marketing at Colonial Downs, and David Lermond, Fiscal Officer at the Virginia Racing Commission, furnished vital financial, employment and tax revenue data needed to estimate the economic impact of Virginia horse racing.

Professor Thomas Guterbock, Jim Ellis, Kathy Coker, David Shreve, and John Lee Holmes of the Center for Survey Research at the Cooper Center coordinated all aspects of the survey work required for the study. Jim Ellis developed the survey design and also wrote the survey methodology section of this study (Appendix A.3). Several other persons at the Cooper Center provided assistance. Professor John Knapp consulted on important design issues at the beginning of the study and provided comments and edits on drafts of the

final study. Steve Kulp and Dave Borszich provided assistance in preparing the study document. Naushad Parpia assisted with survey follow-up and data entry. Any errors or omissions remain the responsibility of the author

Terance J. Rephann, Ph.D.
Regional Economist
Center for Economic and Policy Studies
Weldon Cooper Center for Public Service
University of Virginia

Charlottesville, Virginia
March 2011

EXECUTIVE SUMMARY

Virginia's horse industry encompasses a variety of activities from breeding, training and boarding to recreational pursuits such as racing, showing and other competitions. Over the past several decades, the intensity, scale and scope of these activities have increased rapidly in Virginia. Horse ownership has become more popular and venues offering opportunities for racing, showing and trail riding have spread across the commonwealth. As a result, the horse industry has come to play a more visible role not only in agriculture but tourism and recreation as well. The spending in these sectors, in turn, supports numerous other industries.

This study examines the economic impact of Virginia's horse industry using input-input analysis, a research tool that allows one to quantify the impact of an economic activity or expenditure in a region. For Virginia's horse industry, the spending associated with horse owners, commercial horse operations, out-of-state show and race participants, and horse event spectators constitutes the direct contribution to the state's economy. Linkages with other industries in Virginia's supply chain mean that this spending has further stimulative effects that result from the purchases of goods and services and payments to employees. The horse industry expenditures cause a "ripple effect" or "multiplier effect" that results when money is re-spent in an economy.

The study uses an industry standard input-output model called IMPLAN (IMpact analysis for PLANning) to generate customized impact analyses for the commonwealth of Virginia and each of its localities. Input data for the impact analyses were drawn from surveys of horse owners and operations and surveys of participants and spectators at horse shows, competitions, and pari-mutuel facilities. Other sources of information were surveys of horse show competition sponsors and data collected from Colonial Downs and the Virginia Racing Commission.

Statewide economic impact results are disaggregated into three categories: (1) expenditures on horse maintenance and support by horse owners and operations, (2) expenditures on horse shows and competitions, and (3) expenditures associated with pari-mutuel racing activities licensed by the Virginia Racing Commission. The economic effects from these expenditures are measured using several different economic metrics, including employment, sales, value-added, labor income and tax revenue.

Among the key findings of the study are the following:

- The Virginia horse industry had a total economic impact of 16,091 jobs in 2010. The labor income impact was $502.4 million. The value-added impact (which includes labor income, property income such as interest, rent and profits, and indirect business taxes, and is directly comparable to gross domestic product) was $669.8 million. The total sales impact (which includes intermediate sales as well as sales for final demand) was $1.2 billion.

- The Virginia horse industry accounted for $65.3 million in total state and local taxes in 2010. State taxes are estimated at $37.5 million. Of this total, the largest portion was from the individual income tax ($18.5 million), followed by the sales and use tax ($9.2 million). Other taxes (e.g., the corporate income tax, the motor vehicle fuels tax) amounted to $7.9 million. State pari-mutuel racing license revenues were $1.9 million. Local government taxes are estimated at $27.8 million. The largest category was "other taxes" ($20.9 million) of which real property taxes form the largest part. The local option sales and use tax and the meals tax each brought in more than $2 million. Local pari-mutuel revenues were $911.1 thousand.

- The impacts of the Virginia horse industry were felt in various sectors of the economy. The largest effects in terms of employment were in the agriculture and services sectors. Also experiencing large economic effects were trade and construction. The direct effects of industry purchases were dominant in agriculture (which includes farming as well as agricultural support services such as farriers and groomers) and construction. Service and retail sector impacts reflect the direct effects of industry spending as well as indirect and induced effects.

• The expenditures of Virginia horse owners and operations accounted for 12,685 jobs, $410.1 million in labor income, $526.1 million in value-added, and $926.3 million in total sales. The tourism-related expenditures of in-state residents and total expenditures (both horse-related and tourism related) of out-of-state residents accounted for 2,294 jobs, $59.3 million in labor income, $92.6 million in value-added, and $172.6 million in total sales. Pari-mutuel racing activities had an economic impact of 1,112 jobs, $32.9 million in labor income, $51.1 million in value-added, and $103.2 million in total sales.

• The economic effects of Virginia's horse industry can be felt throughout the commonwealth. However, the largest regional concentration of economic impacts is in Northern Virginia. Indeed, Fauquier and Loudon counties each had over 800 jobs attributable to the horse industry. The largest employment impact in a single locality, however, is found in Rockbridge County (including the cities of Lexington and Buena Vista) where an estimated 1,331 jobs are stimulated. This impact reflects the important role of the Virginia Horse Center, other equine shows and competitions held in the county, and a relatively large inventory of 3,700 horses. New Kent County, home to the Colonial Downs racetrack, which directly employs nearly 400 people during the Thoroughbred racing season, is another significant economic activity center with a total employment impact of 789.

• The estimated attendance at Virginia horse shows and competitions during 2010 was 934,000. Attendees were participants, members of participants' travel parties or spectators. Nearly 46 percent of horse show and competition attendees were drawn from the locality in which the event was held. Another 40 percent came from elsewhere in Virginia. Fourteen percent were out-of-state residents.

• Attendance at Colonial Downs during the Thoroughbred and harness seasons was 74,000. Of that total, an estimated 9.9 percent resided locally, 79.5 percent came from elsewhere in the state, and 10.6 percent from out of state. For the eight off track betting (OTB) locations where tallies were available, 325,000 attended. Of this total, 32.6 percent resided in the city or county where the OTB was located, 45.3 percent resided elsewhere in the state, and 22.1 percent came from out of state.

• The in-state expenditures of horse event attendees varied widely based on the type of event they attended (i.e., horse show and competition, pari-mutuel race, OTB), whether they were in-state or out of state residents and whether they were participants or spectators. Out-of-state show and competition participant parties spent on average $2,983 per event while in-state parties spent $1,590. Out-of-state show and competition spectator parties spent on average $891 while in-state parties spent $181. Non-wager spending of out of state Colonial Downs patrons was $413 and in-state spending was $95. Non-wager spending of out of state OTB patrons was $264 while in-state spending was $49.

• The input-output analysis was not able to capture all of the economic effects of Virginia's horse industry. For example, it did not examine the full effects of equine-related agri-tourism and trail riding. However, studies conducted for other states show that they can be a significant source of spending and economic activity. Moreover, the study does not consider the wider social economic benefits and costs of horse ownership. For example, information collected for the study suggests that the Virginia horse industry is helping to offset the decline in the number of farms and helping to preserve over 1,000 miles of open space.

INTRODUCTION

In the last two decades Virginia's horse industry has grown to play an increasingly more visible role in Virginia's farm economy. While annual sales of Virginia's crops and livestock have remained largely stagnant (Rephann 2008), the sales, inventory and total value of horses in Virginia have grown rapidly. However, it would be a mistake to restrict an economic analysis of horses to an examination of their agricultural roles. They are multifaceted creatures and play various roles in the economy: they are therapeutic aids, sports competitors and entertainers, police/rescue mounts, and more. Consequently, the horse industry is economically varied as well. It affects not only the farm sector, but the household, tourism and recreation sectors. The spending of these sectors, in turn, supports numerous other industries.

This study mainly updates a previous study of the horse industry, *2001-2002 Study of the Economic Impact of the Equine Industry in Virginia,* conducted by the Wessex Group eight years ago. Similar to that study, this one uses an input-output analysis tool to estimate the impact of the horse industry on Virginia's economy. Like that study, it also divides the total economic impact into three categories: (1) effects due to the expenditures of horse operations (e.g., horse owners, farms, breeders, boarding facilities), (2) effects attributable to expenditures on horse shows and competitions, and (3) effects traceable to the expenditures attached to pari-mutuel racing activities licensed by the Virginia Racing Commission. However, unlike that study, this one produces entirely new estimates for the effects of the industry on state and local tax revenues. Moreover, effects for employment, income, output and local tax revenues are presented for Virginia counties and independent cities.

The Virginia horse industry has increased in size since the 2001-2002 period because of expansion in two of the three components of economic effect. The Virginia horse population is larger and more is being spent by horse operations. In addition, the Virginia show and competition calendar has expanded and offers a variety of events throughout the commonwealth. The Virginia racing industry, which is the smallest of the three components, saw significant growth until 2007 but experienced a contraction in attendance and wagering since then because of competitive pressures and the effects of the recent recession on consumer spending.

The study is divided into several sections. The first section describes the history, development and current status of Virginia's horse industry based on current and historical data available from sources such as agriculture censuses, prior horse economic impact surveys, Virginia Racing Commission reports, and other sources. The second section defines the horse industry, describes the economic methodology and the IMPLAN software tool used for the analysis. The third section presents information on horse industry direct expenditures used as input data for the analysis. The fourth section provides the results of the economic analysis. The results are presented in aggregate as well as by source. In addition, economic activity is estimated at both the industry and locality levels. The fifth section discusses other economic benefits and costs of the horse industry that are not captured in the economic analysis. Additional technical details about methodologies and sampling techniques used in the study are provided in the appendices. Finally, a glossary of economic modeling and horse industry terminology used in the study is provided for those unfamiliar with the lexicon of these fields.

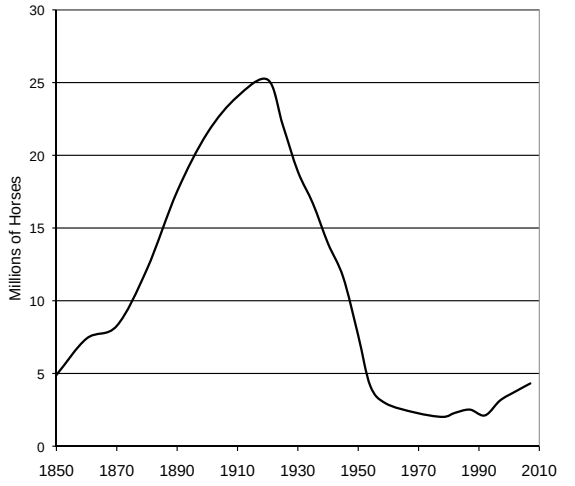
SECTION 1
VIRGINIA'S HORSE INDUSTRY

History, Population and Development

Throughout much of its history, horses have played a vital role in Virginia's growth and development. Horses arrived with the settlers at Jamestown (Campbell 2010). Like elsewhere in America, they were the primary means of transportation and provided much of the energy for farm and industrial production. They were crucial for moving soldiers, materiel and artillery in times of war. They were also used for racing and recreation. From 1840 to 1910 they grew in number. However, widespread mechanization made possible by the invention of the electric motor, telephone and automobile gradually made them redundant and their number dwindled in Virginia and throughout the nation (Campbell 2010).

In the past three decades, after years of decline, U.S. and Virginia horse populations have rebounded, stimulated mainly by the increasing interest in horses for use in recreational activities and sport (Gerena 2005). This growth parallels broader national increases in disposable income and consumer expenditures on recreation and leisure activities. **Figure 1.1** shows that the farm-based horse population more than doubled from a low point of just over 2 million to 4.3 million between 1978 and 2007. Although federal government statistical agencies, such as the U.S. Department of Agriculture (USDA), do not provide regular estimates of the non-farm horse population, information assembled from periodic National Agricultural Statistics Service (NASS) reports and surveys conducted for national horse associations such the American Quarter Horse Association and the American Horse Council suggests that the non-farm population is increasing even more rapidly than the farm-based population (see **Table 1.1**). The most recent estimate for the entire U.S. horse population is provided by an American Horse Council study (Deloitte Consulting 2005), which places it at 9.2 million.

Figure 1.1 United States Farm-based Horse Population, 1850-2007



Source: U.S. Department of Agriculture, National Agricultural Statistics Service (2006, 2009)

It seems likely that this growth continued until at least relatively recently. A 2009 survey showed that respondents were more likely to indicate that they owned, leased and/or managed a larger number of horses compared to three years earlier than those respondents who indicated the reverse (American Horse Publications 2010). On the other hand, respondents were also more likely to indicate that they would reduce the number of horses they had two years hence than they were to indicate that they would increase the number. These results are consistent with growing evidence that the unwanted and abandoned horse problem is increasing, in large part due to the downturn in the national economy (Unwanted Horse Coalition 2009).

Virginia is an important player in the growing national horse industry. It ranks twelfth in number of horses according to estimates made for the American Horse Council (see **Table 1.2**). On the other hand, it ranks fifteenth for farm-based horses according to the 2007 Census of Agriculture, reflecting the greater importance of horses in ranching and farming activities in larger agricultural states in the Midwest and West.

Virginia's horse industry has grown to play an increasingly prominent role in Virginia's farm economy. While annual price-adjusted sales of Virginia's crops and livestock have remained largely stagnant over the

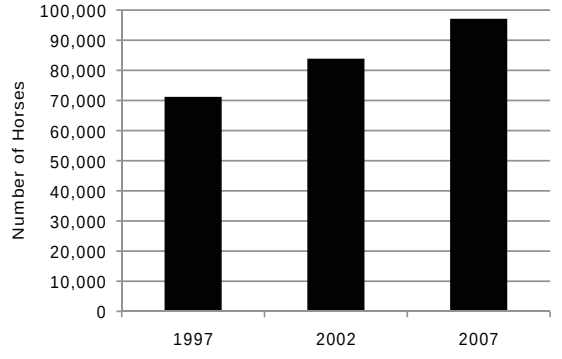
Table 1.1 United States Horse Population Estimates, Selected Years

Year	Source	Estimate (Millions)	Population Covered
1986	American Horse Council	5.25	All horses
1986	American Veterinary Medical Association	6.60	"Pet" horses only
1991	American Veterinary Medical Association	4.90	"Pet" horses only
1996	American Horse Council	6.90	All horses
1996	American Veterinary Medical Association	4.00	"Pet" horses only
1997	USDA Agriculture Census	3.02	On-farm horses only
1998	USDA-NASS	5.25	All horses
1999	USDA-NASS	5.35	All horses
2001	American Veterinary Medical Association	5.10	"Pet" horses only
2002	USDA Agriculture Census	3.64	On-farm horses only
2005	American Horse Council/Deloitte Consulting	9.20	All horses
2007	USDA Agriculture Census	4.30	On-farm horses
2007	USDA Business Plan	5.80	All horses
2007	American Veterinary Medical Association	7.30	"Pet" horses only

Sources: Freeborn (2009), U.S. Department of Agriculture, Animal and Plant Health Inspection Service (2006), and American Veterinary Medical Association (2007)

last two decades (Rephann 2008), the farm inventory, total value, and sales of horses in Virginia have grown. Virginia's farm-based horse population advanced from 71,201 in 1997 to 97,112 ten years later, a growth of 36 percent (see **Figure 1.2**). Farm-based horse sales made up almost 4 percent of agricultural cash receipts in 2004 compared to less than 1 percent in the 1960s and early 1970s, ranking them ninth highest among major categories of livestock, poultry and crops (see **Table 1.3**) in 2004, the last year disclosed estimates are available.[1]

Figure 1.2 Virginia Farm-based Horse Population, 1997, 2002 and 2007



Source: U.S. Department of Agriculture, National Agricultural Statistics Service (2004, 2009)

Focusing on farm-based horses is too restrictive. Most of Virginia's farm population lives off farm. Estimates of Virginia's total horse population vary widely because of different sampling sizes and methodologies. However, the most recent survey conducted by the Richmond field office of the National Agricultural Statistics Service estimates that there are approximately 215,000 horses in the state (see **Table 1.4**), more than twice the number of the farm-based population estimate (U.S. Department of Agriculture, National Agricultural Statistics Service, 2008). Estimates available from the American Horse Council place the population somewhat larger, 239,102 in 2003 (Deloitte Consulting 2005), but the sampling method used was less rigorous.

Virginia's horses have varied uses and represent many breeds. Almost half of Virginia horses are used for pleasure/trail riding (see **Figure 1.3**). This result is similar to results of the American Horse Council study

1 Computations based on data from U.S. Department of Agriculture, Economics Research Service Farm Income Data Files http://www.ers.usda.gov/data/farmincome/finfidmu.htm

Table 1.2 State Horse Populations and Rankings, All Horses and Farm-Based Horses, 2005 and 2007

	All Horses, 2005[a]		Farm-Based Horses, 2007[b]	
State	Number	Rank	Number	Rank
Alabama	148,152	30	97,952	14
Alaska	11,449	47	2,330	50
Arizona	177,124	23	70,770	31
Arkansas	168,014	24	86,631	22
California	698,345	2	187,874	2
Colorado	255,503	10	123,995	11
Connecticut	51,968	41	11,938	45
Delaware	11,083	48	4,070	48
District of Columbia	33	51	0	51
Florida	500,124	3	126,858	7
Georgia	179,512	20	85,658	23
Hawaii	8,037	49	6,807	47
Idaho	158,458	27	77,800	27
Illinois	192,524	18	83,878	25
Indiana	202,986	15	85,546	24
Iowa	199,220	17	76,197	28
Kansas	178,651	21	94,356	16
Kentucky	320,173	5	187,316	3
Louisiana	164,305	26	65,292	33
Maine	37,854	43	12,564	44
Maryland	152,930	28	31,868	39
Massachusetts	37,529	44	21,572	41
Michigan	234,477	13	105,572	13
Minnesota	182,229	19	93,841	18
Mississippi	113,063	35	72,343	29
Missouri	281,255	7	161,150	5
Montana	129,997	32	109,635	12
Nebraska	150,891	29	68,386	32
Nevada	51,619	42	18,805	42
New Hampshire	14,681	46	10,603	46
New Jersey	82,982	39	31,332	40
New Mexico	147,181	31	55,505	35
New York	201,906	16	87,823	20
North Carolina	256,269	8	86,923	21
North Dakota	59,391	40	45,560	37
Ohio	306,898	6	125,812	9
Oklahoma	326,134	4	178,887	4
Oregon	167,928	25	94,191	17
Pennsylvania	255,763	9	126,094	8
Rhode Island	3,509	50	3,582	49
South Carolina	94,773	37	47,833	36
South Dakota	120,878	33	72,007	30
Tennessee	206,668	14	160,353	6
Texas	978,822	1	499,617	1
Utah	120,183	34	61,723	34
Vermont	24,540	45	14,233	43
Virginia	239,102	12	97,112	15
Washington	249,964	11	93,532	19
West Virginia	89,880	38	40,423	38
Wisconsin	178,636	22	125,763	10
Wyoming	99,257	36	82,721	26
United States	9,222,850		4,312,633	

a Deloitte Consulting (2005).

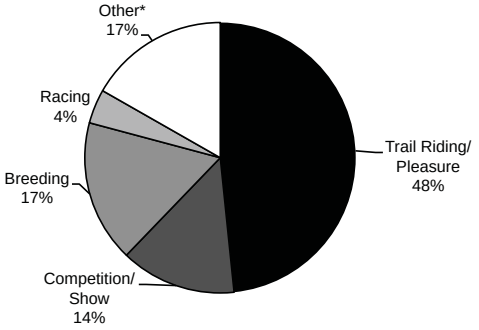
b U.S. Department of Agriculture, National Agricultural Statistics Service (2009).

Table 1.3. Virginia Farm Commodity Cash Receipts, 2004

Commodity	Cash Receipts ($ Thousands)
Broilers and farm chickens	591,501
Cattle and calves	317,677
Milk, wholesale	308,417
Greenhouse/nursery	234,880
Turkeys	175,890
Soybeans	126,456
Tobacco	112,920
Corn	103,230
Horses/mules	**102,400**
Tomatoes	95,931
Chicken eggs	69,703
Hogs	67,599
Misc. vegetables	48,173
Fruits/nuts	47,663
Hay	44,264
Other poultry	37,400
Aquaculture	35,924
Other livestock, sheep, lambs, honey, and wool	34,446
Wheat	33,731
Cotton	31,975
Peanuts	21,632
All other crops	8,298
Sheep and lambs	2,956

Source: U.S. Department of Agriculture, Economic Research Service (2010)

Figure 1.3 Virginia Horses by Primary Use, 2006



Source: U.S. Department of Agriculture, National Agricultural Statistics Service (2008).
* "Other" category uses include hunting, working, driving, training, dressage, police/rescue, and all other uses.

(Deloitte Consulting 2005), which shows that 42 percent of horses are used recreationally rather than for competitive, work or breeding purposes. Virginia's two most popular horse breeds, the American Quarter Horse and the Thoroughbred (see **Table 1.5**), are also the most popular U.S. breeds (Deloitte Consulting 2005). These breeds have a long connection to Virginia. The Quarter Horse was bred in Virginia and the first Thoroughbreds were imported to America through Jamestown. The respective ranks of these breeds reversed from the 2001 Virginia Equine Survey Report (U.S. Department of Agriculture, National Agricultural Statistics Service 2002), however, because of a large increase in the Quarter Horse and concomitant drop in the Thoroughbred populations. Both breeds are popular choices for racing as well as competitive horse events. The Tennessee Walker and Arabian are other important Virginia breeds.

Table 1.4 Virginia Horse Population Estimates, Various Sources, Selected Years

Year	Source	Estimate	Population Covered
1995	Wessex Group (1996)	225,400	All horses
1997	USDA, NASS (2004)	71,201	On-farm horses only
1998	USDA, NASS (1999)	145,000	All horses
1999	USDA, NASS (1999)	150,000	All horses
2001	USDA, NASS (2002)	170,000	All horses
2002	USDA, NASS (2004)	83,871	On-farm horses only
2003	American Horse Council/Deloitte (2005)	239,102	All horses
2006	USDA, NASS (2008)	215,000	All horses
2007	USDA, NASS (2009)	97,112	On-farm horses only

Table 1.5 Virginia Horse Population by Breed, 2006

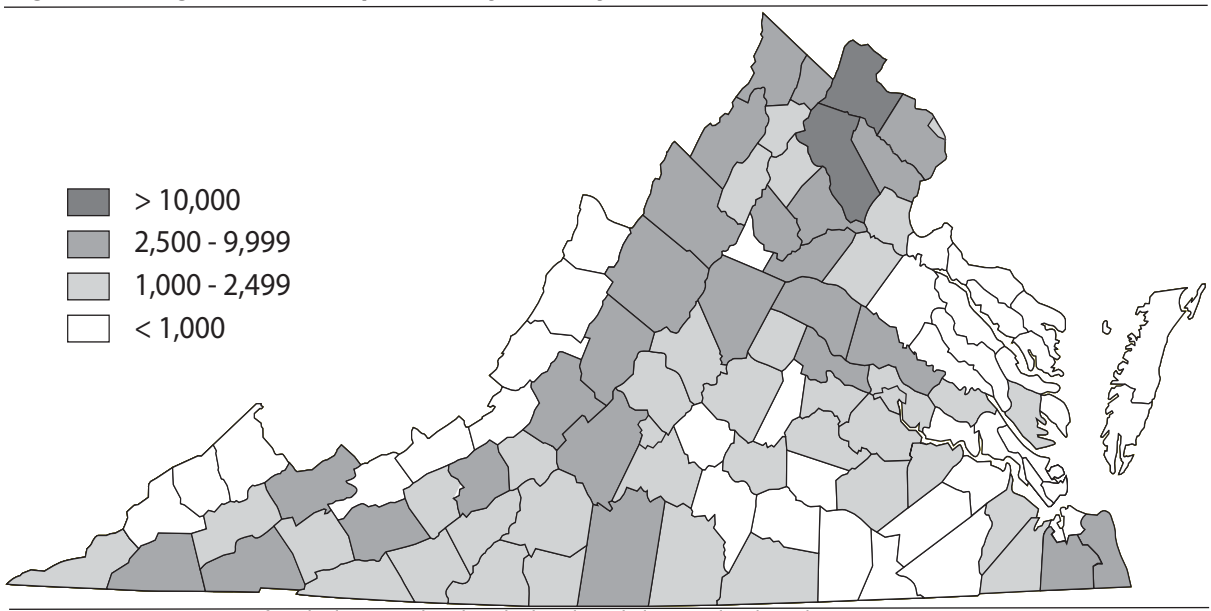
Breed	Number	Percent of Total
American Saddlebred	7,300	3.4
Appaloosa	9,400	4.4
Arabian and Anglo- Arabian	13,200	6.1
Belgian	3,000	1.4
Hanoverian	2,200	1.0
Miniature horses	5,800	2.7
Morgan	2,800	1.3
Paint/Pinto	10,900	5.1
Paso Fino	1,400	0.7
Pecheron	2,700	1.3
Quarter Horse	49,000	22.8
Standardbred	4,000	1.9
Tennessee Walker	15,500	7.2
Thoroughbred	30,900	14.4
Mules, donkeys	13,400	6.2
Ponies	13,800	6.4
Other equine	29,700	13.8
Total	215,000	100.0

Source: U.S. Department of Agriculture, National Agricultural Statistics Service (2008)

Horses can be found in every Virginia county and some of the larger independent cities. However, greater concentrations are found in urban and suburban counties, particularly in Northern Virginia (see **Figure 1.4**). This geographical location pattern is quite different from other livestock such as cattle, hogs and sheep, which tend to be located in rural areas (Kaneene et al. 1997). A comparison of 2001 and 2006 data suggests that the horse population is migrating further away from growing suburban areas because of land development pressures.

Virginia's horse industry is supported by a rich horse tradition, an excellent horse industry infrastructure of facilities and services, and an agreeable climate (Gerena 2005). However, its continued growth and development depends on five factors: (1) availability of affordable undeveloped land, (2) maintenance of an agricultural infrastructure that provides the materials, services and facilities needed for breeding, training, stabling, feeding and caring for horses, (3) a healthy pari-mutuel racing industry, (4) quality show and competition facilities and venues such as the Virginia Horse Center, Commonwealth Park, and Great Meadows Event Park, and (5) an active calendar of shows, competitions, and other equestrian events. The economic impact of the industry will largely be determined by the continued popularity of horse

Figure 1.4 Virginia Horse Population by Locality, 2006



Source: U.S. Department of Agriculture, National Agricultural Statistics Service (2008)

ownership and the strength and tourism drawing power of recreational pursuits such as horse racing, showing and other equestrian activities. Each of these topics is examined briefly below.

Horse Operations

According to the most recent information available (U.S. Department of Agriculture, National Agricultural Statistics Service 2008), counting both households and businesses, there were 41,000 horse operations in 2006, a substantial 41 percent increase from 29,000 reported for 2001 (U. S. Department of Agriculture, National Agricultural Statistics Service 2002). These operations had over $780 million in horse-related expenditures in 2006. This amount was a significant increase over baseline levels reported in 2001, mainly because of a 26 percent estimated growth in the overall horse population, from 170,000 to 215,000 horses. In addition, the estimated average expenditure per equine increased nearly 9 percent from $3,354 to $3,642 measured in 2006 dollars[2].

Typically, there are large differences in average horse expenditure depending on the horse breed and use. Horses used for racing, in particular, and less so, for showing/competitions, incur more expenses for transportation to and from races and competitions (Deloitte Consulting 2005; Broadway et al. 1994) and for stabling at races and shows. But, they also require more spending on training and upkeep due to the stresses, injuries and demands of competitive sports and showing and the need for specialized tack and equipment. Changes in the composition of horse breeds and horse uses, therefore, have implications for horse spending. Results from the Virginia equine surveys suggest that racing uses have decreased significantly from 12,600 to 8,800 from 2001 to 2006, reflecting partly the migration of the Thoroughbred population to states offering more competitive breeding incentives (Bahrampour 2009). Showing uses, however, have remained relatively stable, increasing slightly from 29,100 to 29,700 over the same period. Virginia horse operations spending would likely have been significantly higher without the Thoroughbred population attrition.

2 The 2001 price adjustment was based on IMPLAN deflators by commodity and expense category assignments to commodities described further in Section 3.

Four years have elapsed since the last Virginia horse inventory. Horse operations expenditures may have changed since then because of changes in the total horse population and its composition. Moreover, expenditure patterns may have shifted due to the effects of the 2007-2009 economic recession and increases in feed costs. However, as will be argued in the next section, evidence suggests that these changes probably did not cause a reduction in statewide horse spending.

The expenditures of horse operations are not only significant in and of themselves. They also support other industries, including Virginia's farm economy through the purchase of local agribusiness products such as hay for feed and wood shavings for bedding, and they have multiplicative effects on the economy, an issue that will be explored in other sections of the study

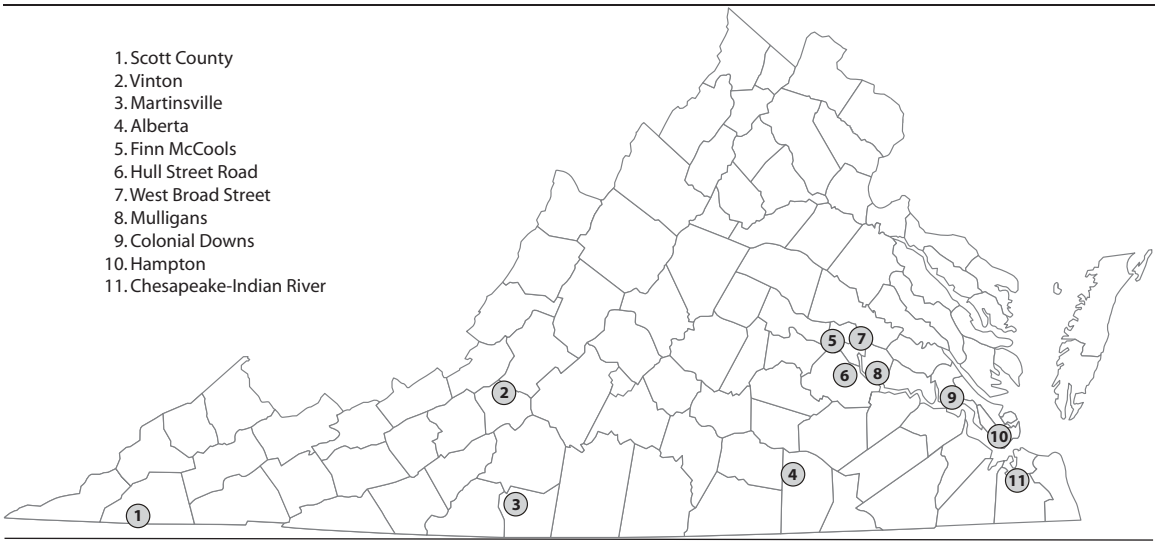
Horse Racing

Virginia was the center of American racing during Colonial days. It had lost that dominance by the end of the 1800s and much of the Thoroughbred industry had migrated to Kentucky (Johnson and Crookshanks 2008). It wasn't until the General Assembly legalized pari-mutuel gambling in 1996, established the Virginia Racing Commission as regulatory authority, and authorized the Colonial Downs racetrack, that the winds began to change.

Colonial Downs, located in New Kent County in the Peninsula, is privately owned by Jacobs Entertainment. It has the nation's premier grass turf racing track as well as a 1.25-mile dirt track. Colonial Downs features Thoroughbred racing during June to mid-August and Standardbred (harness racing) from mid-September to early November. It also hosts a number of other horse events such as the Strawberry Hills Steeplechase Race and non-horse events such as tournaments, festivals and concerts during the year. Simulcast wagering is offered at ten off-track betting (OTB) facilities located throughout much of southern half of Virginia, including four in the Richmond area, two in the Hampton Roads region, two in the Southwest, and two in Southside (see **Figure 1.5**). These OTBs account for the bulk of state pari-mutuel wagers.

One measure of the Virginia racing industry's overall economic health is the total amount of money

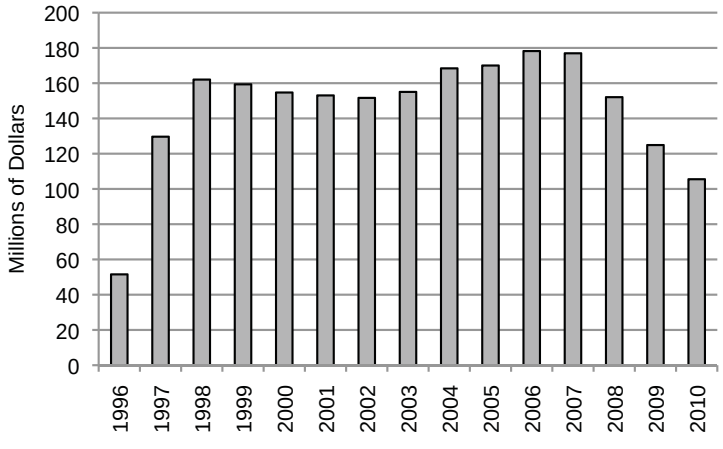
Figure 1.5 Virginia Pari-mutuel Racing and OTB Facilities



wagered. Virginia's racing wagers initially grew with the opening and maturation of the Colonial Downs track, expansion in state off-track betting opportunities, interstate simulcast (live horse race video feeds of horse races around the nation and world), and the addition of telephone and computer account wagering (see **Figure 1.6**). However, like any sporting and recreational product, demand for pari-mutuel wagering overall and at individual locations depends not only on the location, quality and price (i.e., betting odds) of the product, but the proximity, price and quality of recreational substitutes and the disposable personal income levels of consumers (Ali and Thalheimer 1997; Thalheimer and Ali 1995).

Developments in the gaming industry have had a huge impact on pari-mutuel racing throughout the country. Stand-alone pari-mutuel facilities find themselves rapidly losing market share to casino gambling, Internet gambling, and racinos (Cummings Associates 2004). For Virginia, competition from neighboring states is intense and escalating. West Virginia and Pennsylvania have legalized slot machines at track and off-track locations. Maryland is in the process of licensing them. And, Kentucky is currently considering slots legislation (Tuna and Scheck 2010). The recent deep recession has also affected racing revenues, and indeed, all gambling revenues, as hard-pressed consumers cut back on their discretionary spending (Dadayan and Ward 2009). As a result, Virginia pari-mutuel wagering has been particularly hard hit and has plummeted to levels in price-adjusted dollars last seen in the first two years of Colonial Downs' operation in 1996 and 1997.

Figure 1.6 Virginia Pari-mutuel Wagering in 2010 Constant Dollars 1996-2010



Source: Virginia Racing Commission (2010)

Horse racing is important to the state economy for several reasons. First, it helps to support Virginia's tourism industry, providing a major attraction

for the Tidewater region and directly employing over 300 full-time and part-time workers at the facility itself during the Thoroughbred racing season. Second, the racetrack also attracts out-of-state racehorse participants who pay for local services such as trainers, jockeys and grooms, and other costs associated with the race stay. Third, racetrack and OTBs help to retain in-state bettors who would otherwise gamble in out-of-state venues. Fourth, since a portion of the wagers is withheld for local and state taxes, the industry helps support public expenditures. In addition, portions are allotted to the Virginia Breeders Fund, the Virginia-Maryland Regional College of Veterinary Medicine, the Virginia Equine Center Foundation, and the Virginia Horse Industry Board, which help support horse breeding activities in the state and the horse industry in general. Lastly, a portions of the wager pool is used for horse winner purses and prizes.

Shows, Competitions, and Other Events

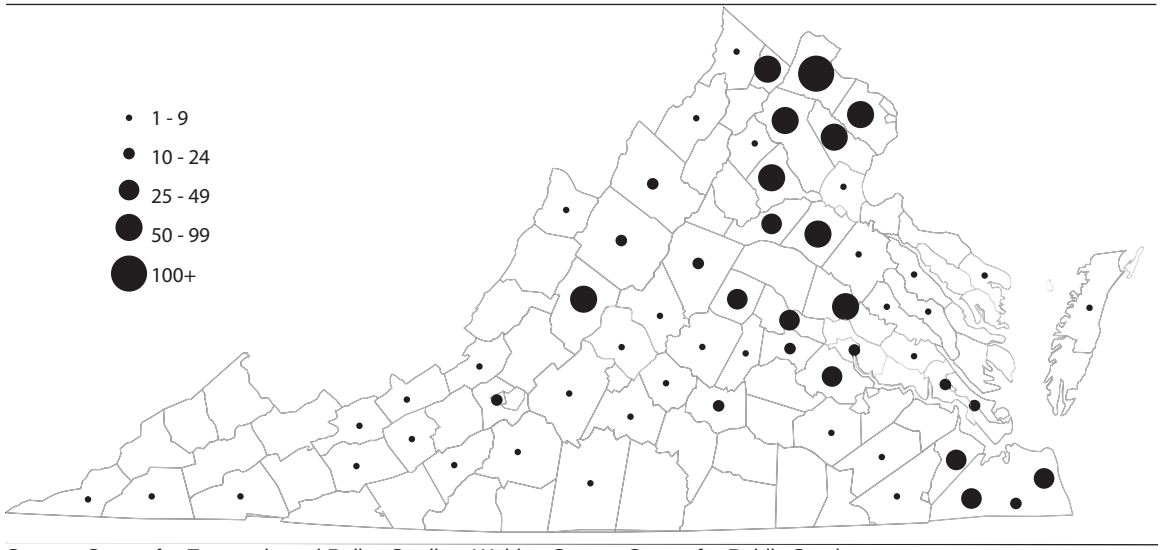
Virginia hosts some of the nation's most venerable equestrian events such as the Upperville Colt and Horse Show (the oldest hunter and jumper show which started in 1853), the Strawberry Hill Races (a steeplechase race begun in 1895), and the Warrenton Pony Show (established in 1920). The commonwealth has an active annual calendar of horse shows, competitions, and other horse related events such as clinics, auctions, trail rides, and polo games. Some of the shows attract national attention and riders from across the United States and the world.

Horse shows are judged competitions in which awards are made for the conformation, disposition, or performance of the horse or for skill exhibited by the rider. They are usually categorized by region, discipline or breed. Many shows are open to different breeds or feature varied disciplines. However, some are restricted to particular breeds or emphasize a specific type of competition. Usually shows are divided into classes in which similar types of horses and rider skill levels compete in a given activity. Shows and competitions may be either sanctioned or unsanctioned. Sanctioning may result from local, state or national organizations. In many instances, local horse clubs are regional affiliates of state and/or national organizations. For instance, the United States Dressage Association has a group member organization, the Virginia Dressage Association, which in turn has eight Virginia chapters (Central, Northeast, Charlottesville, Northern, Shenandoah, Fredericksburg, Southwest and Southeast). The presence and quality of sanctioning has been found to be a key determinant of show participation levels (Stowe and Burdine 2009).

An exact enumeration off horse events is difficult to obtain because a comprehensive state show calendar does not exist. Lists of events must be assembled piecemeal from leading equestrian publications, national, regional and local horse clubs and associations, and the schedules listed by individual facilities. Moreover, the list must be revised based on cancellations and rescheduled activities. Using definitions and methodology explained in greater detail in Appendix A.1, it was determined that there were at least 1,193 horse shows and activities during 2010.

These events were categorized in various ways to help create a profile of Virginia's show and competitions. Horse events were categorized in terms of the expected geographical origin of participants with events being identified as having national, regional, state or local draws. Local events were characterized as drawing participants mainly from the locality where the event occurs or localities contiguous to the event locality. State events drew primarily from within Virginia. Regional events likely drew from within the state as well as adjoining states, while national events draw even farther afield. Events were also coded for the dates and locations. Lastly, events were also classified by major discipline. Virginia shows and competitions feature a wide variety of disciplines including those recognized and sanctioned by major horse associations such as the United States Equestrian Federation, the United States Dressage Association, the American Quarter Horse Association, etc. An exact taxonomy is not possible since events may combine disciplines in different ways. To simplify matters events were designated as falling into four general categories based on descriptive information and programs for the events. These categories included hunter-jumper shows, dressage competitions (which encompassed eventing, horse trials and combined tests), western riding events,

Figure 1.7 Virginia Horse Shows and Competitions by Locality, 2010



Source: Center for Economic and Policy Studies, Weldon Cooper Center for Public Service

and a catch-all category called "other" which included multi-discipline shows, fun shows, steeplechase races, vaulting, jousting, Gymkhana (a mounted game), etc.

Not surprisingly, the vast majority (995 or 84.5 percent) of Virginia events draw primarily from their local areas while 111 (9.3 percent) have a statewide focus, and the remaining 69 events (5.8 percent) draw significant numbers of participants from outside the state. Most (53.6 percent) of the high-level events are hosted by the Virginia Horse Center. Sixty-nine of Virginia's counties and independent cities hosted at least one event. However, events are also fairly geographically clustered in certain regions. The Northern and Central regions account for the vast majority of events (see **Figure 1.7**) and the Southside region the least. The main venues for Western Region competitions are the Virginia Horse Center in Lexington (which hosted 83 events) and the Green Hill Park Equestrian Center in Salem (which hosted 18 events). **Table 1.6** lists the top ten venues by number of events. At the top is the Virginia Horse Center followed by Frying Pan Farm Park in Herndon and Morven Park in Leesburg.

Given the physical constraints on outdoor competitions during the winter months, the Virginia show and

Table 1.6 Virginia Top Ten Horse Show and Competition Venues by Number of Events, 2010

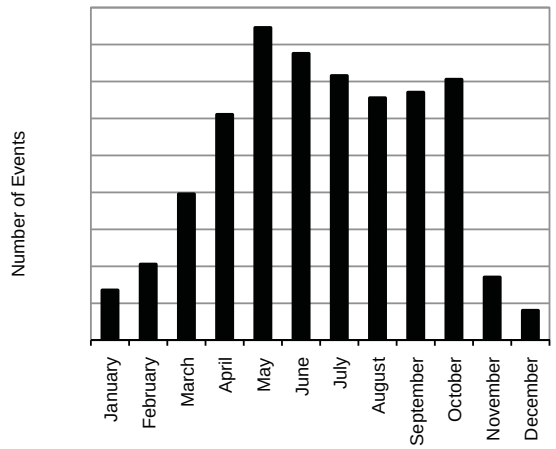
Venue	City or Town	Number of Events
Virginia Horse Center	Lexington	83
Frying Pan Park	Herndon	42
Morven Park	Leesburg	36
Deep Run Hunt Club	Manakin-Sabot	27
Kelly's Ford Equestrian Center	Remington	26
Sandstone Farm	Millwood	24
Fox Chase Farm	Middleburg	22
East Coast Equestrian Training Center	Virginia Beach	19
Green Hill Park Equestrian Center	Salem	18
Hazelwild Farm	Fredericksburg	18

Source: Center for Economic and Policy Studies, Weldon Cooper Center for Public Service

competition season occurs mainly in the late spring, summer, and early fall (see **Figure 1.8**). May is the busiest month, while December sees the least activity. It is unsurprising that most competitions occur on weekends when many people are off work. The average length of a show/competition is 1.3 days. However, this result varies widely based on the audience for the show. National shows are on average 3.3 days; regional events are 2.7 days, state events are 1.9 days, and local shows are only 1.1 days.

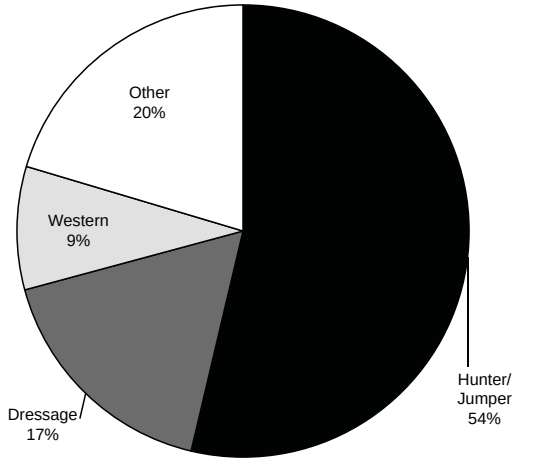
Virginia's horse event character reflects its colonial era beginnings with English disciplines being the most popular events. Hunter/jumper shows are the most common events followed by dressage (see **Figure 1.9**). Nine percent of the shows are western themed shows (e.g., cutting, reining, barrel racing). The remainder are breed shows, mixed theme shows, pleasure/fun events, or races and mounted games. If one restricts the event list to national, regional, and state level shows like those covered by a recent USDA study of horse events held in six states, it is clear that Virginia's show profile more resembles eastern states like New York than Texas or Colorado where western riding events are more common (U.S. Department of Agriculture, Animal and Plant Health Inspection Service 2007).

Figure 1.8 Virginia Horse Shows and Competitions by Month, 2010



Source: Center for Economic and Policy Studies, Weldon Cooper Center for Public Service

Figure 1.9 Virginia Horse Shows and Competitions by Discipline, 2010



Source: Center for Economic and Policy Studies, Weldon Cooper Center for Public Service

The state and local economic impact of races, shows and competitions varies with their size, length and attendance characteristics. Higher attendance translates into more dollars spent locally on food, equipment and services. Multi-day activities require overnight stays that involve lodging expenses. Participants are expected to spend more than spectators because they incur higher costs associated with show entry fees, horse transportation, care and stabling. These impact components themselves may be influenced by other event characteristics. The type of the event in large part determines attendance characteristics and length of stay. For example, rodeos and steeplechase races attract far more spectators than participants, while local hunter/jumper shows involve mainly the horse show participants themselves. Some events require a commitment of several days by their very nature. For instance, eventing typically involves competitions spread out over several days. Event quality as indicated by sanctioning by a national organization can be expected to affect both the event size and length of stay of its participants. Such events will draw from a wider geographical radius than locally sponsored unsanctioned events. Greater travel distances increase the likelihood of overnight stays that result in more money spent in the state and in the local community on lodging, meals and other goods and services.

SECTION 2
METHODOLOGY

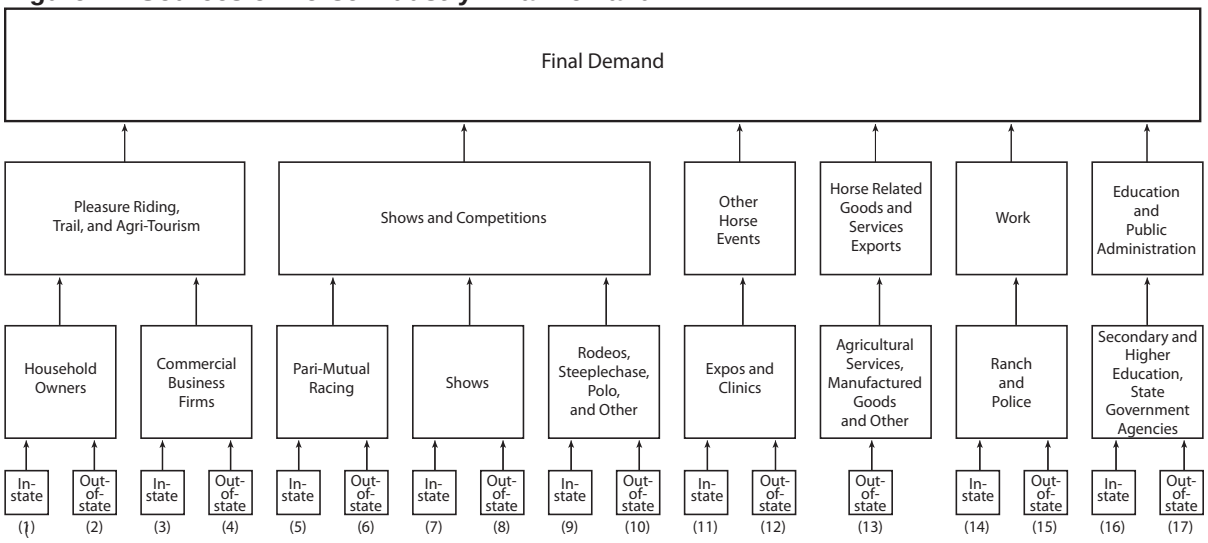
This section lays out important elements of the research design used to generate estimates for the economic impact of the horse industry. A proper definition of the horse industry is a prerequisite for undertaking the study. Also, a description of the economic model used to generate the impact estimates is provided.

Defining the Horse Industry

This study defines the "horse industry" as consisting of activities involved in maintaining and supporting horses and activities associated with recreational and entertainment uses of horses. Most horse owners value horses beyond their income producing value as evidenced by studies that show that owners incur significant net operating losses on average (Deloitte Consulting 2005; Swinker et al. 2003; Gamrat and Sauer 2000). Therefore, expenditures will be used as basis for estimating economic impact rather than horse related sales. See **Figure 2.1**, which shows the sources of horse industry direct expenditures for each horse-related activity included in the definition used for this study. This definition includes resident household horse owners and Virginia commercial business expenditures used in supporting horses for pleasure riding, showing, racing and work. The final demand categories are shown in the bottom two rows of boxes in the figure. They are (1), (3), (5), (7), (9) and (14). These expenditures include items such as feeding, stabling, veterinarian services, transportation, training and registration fees for shows and competitions. The definition also includes the expenditures of both in-state and out-of-state visitors who are not direct participants in horse events but are involved primarily as spectators [(5), (6), (7), (8), (9) and (10)].

There are several categories of income producing activities that are not captured by using this definition. For instance, no attempt is made to capture the economic impact of the out-of-state sales, called exports, of horse related businesses (13). Because of the relatively large size of Virginia's horse industry, it may attract a number of horse businesses such as horse trailer manufacturers, tack and clothing manufacturers, fencing contractors, animal health product manufacturing and feed milling, specialized veterinarian services, and event management services. For instance, Virginia Tech's Marion Dupont Scott Equine Medical Center in Leesburg provides advanced veterinary

Figure 2.1 Sources of Horse Industry Final Demand



Source: Based on figure from Beattie et al. (2001)

specialty care to patients throughout the eastern seaboard. The export of these goods and services is not counted. Attendance at expos and clinics ((11) and (12)) is not captured. Since the study focuses on shows, competitions, and races, the tourism expenditures associated with non-competitive pleasure riding and driving activities are not counted (2). Tourism expenditures associated with dude ranch style vacations, child horse camps, renaissance festivals, zoos, civil war reenactments, and state parks or private resorts where horses are stabled, are not considered (4). In addition, the study does not capture the economic impact of horse-related public administration such as staffing for the Virginia Racing Commission or management, science and recreation/health programs at higher education institutions and private boarding schools [(16) and (17)].[1] Finally, although many of the horse facilities were constructed expressly for horse events, they also often host a variety of other entertainment options (e.g., concerts, festivals, automobile shows, other sports). The economic impacts of these other activities are not included.

Like most studies of this type, this one is called an economic impact study. From a technical standpoint the phrase "economic contribution" or "economic footprint" would better describe results of the analysis undertaken (Watson et al. 2007). An "economic contribution" analysis traces the gross economic activity that results from a given expenditure. It does not consider whether the expenditure used to generate the economic activity might have been used elsewhere in the economy to generate economic activity and gauge the comparative effect of that alternative activity. For instance, horse owners could elect to replace their horse spending with spending on recreational motorboats. In that instance, the re-directed spending would also stimulate the economy through the purchases of equipment, gasoline and other goods and services. An "economic impact" analysis, in contrast, attempts to measure the net economic activity that results. There are two sources of economic impact--the attraction of new expenditures into the region that otherwise would not have been made and the retention of expenditures that would otherwise leave the region. As an example of the former, tourists from outside of the region represent new spending that generates new economic activity. As an example of the latter, if Virginia's horse infrastructure such as show venues and horse veterinary care services did not exist, thousands of horse owners would make their horse-related expenditures outside the region and some might choose to entirely re-locate to states where such services were available. These expenditures are retained in the economy because of a healthy horse industry infrastructure.[2]

Input-Output Analysis

Numerous economic impact studies of the horse industry conducted for other states (Menard et al. 2010; Hughes et al.; Whiting, Molnar and McCall 2006; Beattie et al. 2001) as well as earlier studies of Virginia's horse industry (Lawrence et al. 1997, the Wessex Group 1996, 2003) and of individual Virginia venues such as the Virginia Horse Center (Knapp 2005; Knapp and Barchers 2001a) have relied on input-output analysis. Input-output analysis is a standard tool in regional economics that was developed by Wassily Leontief, a Nobel Prize winner in economics. It is based on models constructed from an input-output table that shows flows of purchases and sales among sectors of the economy. Economic impacts are derived by mathematically manipulating the table.

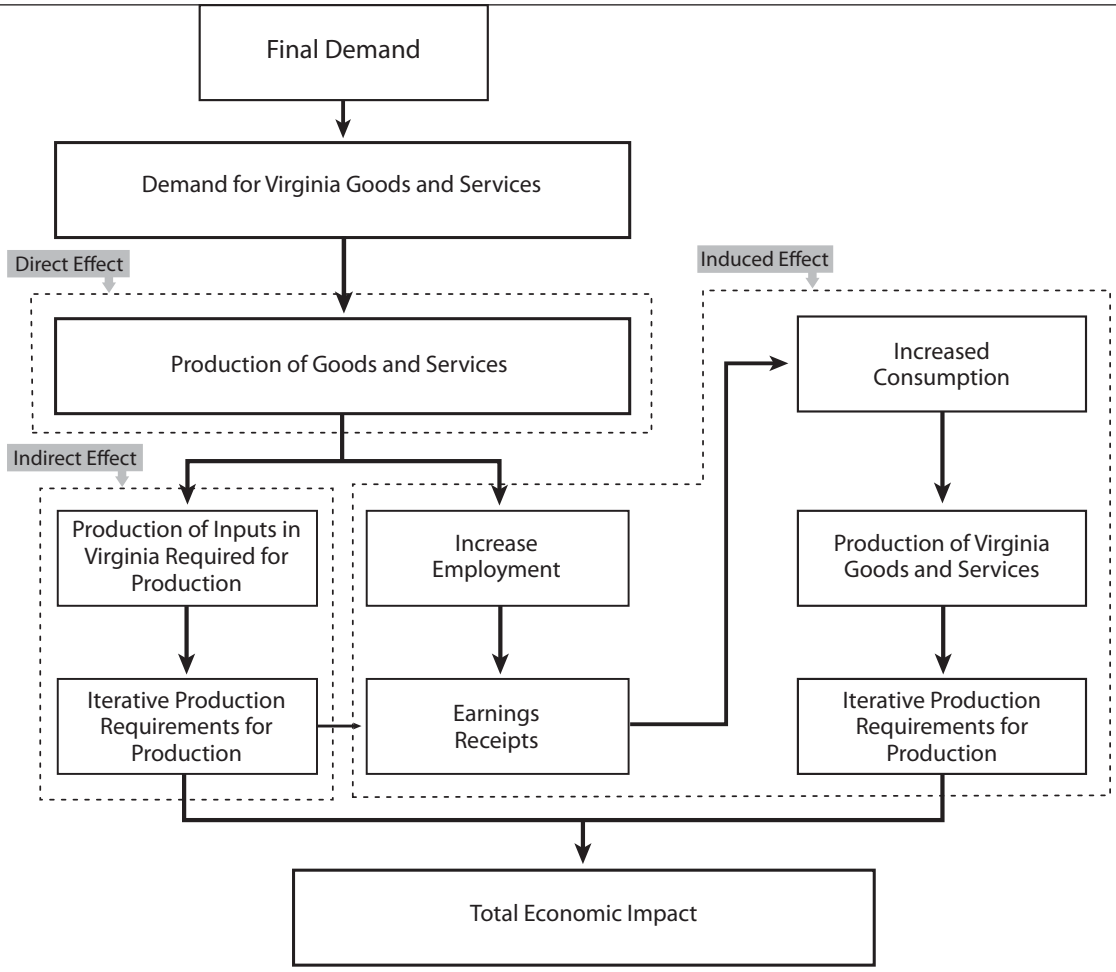
An input-output model can represent the total impact of new spending as consisting of three parts, a "direct effect," "an indirect effect," and an "induced effect" (see **Figure 2.2**).[3] The "direct effect" consists of the injection of economic activity or expenditure into the region. For example, the expenditures of horse operations, the expenditures made by horse show facilities, and participant and visitor expenditures would all count as direct expenditures. However, only the portion of the expenditure made in the state or local economy is counted as a direct expenditure. Expenditures

1 State government agencies include staff at the Virginia Racing Commission and Virginia Department of Agriculture and Consumer Services who regulate various aspects of the horse industry and conceivably could be included in an impact study. However, their impacts are likely to be small and were not considered.

2 The state of West Virginia offers a picture of how Virginia's horse industry might look without its existing horse industry infrastructure such as facilities for shows and competitions, veterinary services, etc. Hughes et al. describe relatively weak inter-industry linkages and other challenges the state faces because of gaps in services and facilities in the state.

3 This discussion refers to a particular type of input-output table called a Social-Accounting Matrix in which institutions such as households are included in the table.

Figure 2.2 Economic Impact Diagram



made on out-of-state products and services are not counted. Moreover, in the case of retail and wholesale consumer purchases, only the amount of expenditure on locally retained retail and wholesale margins and retail and wholesale inputs actually produced within the state are included. This direct expenditure then causes a "ripple effect" on the regional economy when money is re-spent. For example, state businesses provide supplies and services to the horse industry such as bedding and feed, veterinarian services, utilities and insurance. These businesses spend a portion of their sales revenues on their supplies and services from other local and state firms who, in turn, purchase a portion of their supplies and services from other local and state firms. This cascading sequence of spending continues until the subsequent rounds of spending dissipate due to leakages in the form of taxes, savings, and spending outside the state or region. The cumulative effect of these cascading rounds of inter-industry purchases is referred to as the "indirect effect." The final component of total is that portion attributable to the spending of households. That is to say, businesses pay households for their labor services. These households then purchase goods and services from local and state firms who in turn purchase a portion of their labor and material inputs from other local and state firms, and so forth. Again leakages occur at each round due to taxes, savings, and purchases of goods and services outside

of the region or state. The "induced effect," is the sum of all impacts associated with household purchases.

The impact analysis for this study used IMPLAN, a model that has been used in many economic impact studies, including studies of the regional economic impacts of the horse industry in Virginia and other states. IMPLAN (IMpact analysis for PLANning) is an industry standard input-output model. The model uses the most current available national and regional economic data from several federal government agencies to update and regionally customize an older national table (in this case, the 2002 United States Benchmark Table). The result is a 440 sector input-output table that is customized for the particular region of study. Since this study involved both a statewide and local analyses, the tables were customized for Virginia and each of its localities.

Impacts are evaluated within IMPLAN using five different measures: (a) total sales or total industrial output (TIO), (b) labor income, (b) value-added, (c) employment, and (d) tax revenues. Total sales or industry output is the total value of industry production during a period. It measures sales of intermediate inputs for use in production as well as sales of products to final consumers. Value added is a subset of total industrial output. It reflects only sales to final consumers and therefore avoids the double counting that occurs when intermediate inputs are included. It is the most commonly used measure of economic activity. Value-added is the concept behind gross domestic product (GDP) and can be compared to the GDP numbers provided by the Bureau of Economic Analysis for states and metropolitan areas. It can also be represented as total factor income plus indirect business taxes. Employment is measured in terms of person-years of employment. A person-year of employment is a job of one year in duration. Employment includes full-time and part-time workers as well as the self-employed and is measured by place of work. Although tax revenue estimates are available from IMPLAN, we used a more customized approach using exact tax rates and appropriate tax bases to improve accuracy. The computations rely on current tax information from Virginia and its localities from *Virginia Local Tax Rates, 2009* (Knapp, Shobe, and Kulp 2010) and *Comparative Report of Local Government Revenues and Expenditures* (Auditor of Public Accounts 2009, 2010). The methodology used is explained in further detail in Appendix A.1.

Statewide impact results will be presented as well as estimates of local impacts for counties and independent cities. Lastly, state and local tax revenue impacts will be estimated.

SECTION 3
HORSE INDUSTRY EXPENDITURES

This section describes sources of data for estimating direct expenditures in the horse industry. The direct expenditures of the various components of the horse industry are needed to estimate the total economic impact. These direct expenditures are generated by horse operations such as farms, breeding facilities, and boarding facilities, by the expenditures of pari-mutuel race facilities and spectators, and by the expenditures of horse show and competition providers, spectators, and out-of-state participants. Data on the direct expenditures of the horse industry were obtained from three sources: (a) horse owners and operations expenditures reported in the *2006 Virginia Equine Survey Report*, (b) characteristics of horse event participants and attendees collected from surveys of horse event managers, horse event attendees and Colonial Downs, and (c) expenses of participants and patrons at races or events collected from surveys of horse event attendees. Each of these sources is explained in more detail below.

Horse Operations Expenditures

This study makes use of expenditure data for horse operations and equine population figures reported in the *2006 Virginia Equine Survey Report* compiled by the Richmond Office of the National Agricultural Statistics Service. The survey population included Virginia horse owners, horse farms, breeding facilities, boarding facilities, and other horse-related private and commercial operations that have horses. The NASS equine survey has been conducted twice in Virginia with the first in 2001. Similar surveys have been conducted in a handful of other states. The survey is based on a three-phase multiple area frame sample design that produces state equine inventory estimates with a relatively small degree of statistical error. The expenditure estimates are disaggregated into categories that are easily amenable to regional economic impact modeling.

Since expenditures are expressed in terms of 2006 prices, it was necessary to revise them to reflect 2010 price levels. Each category of expenditure is inflated to 2010 price levels using IMPLAN commodity deflators.[1] This adjustment corrects for price increases in items such as feed and bedding, which have fluctuated widely since the survey. However, it will not capture changes in horse expenditures due to cyclical factors, such as deferment of discretionary purchases of tack and equipment. The implicit assumption of using the 2006 expenditure data is that the horse population and composition and amount of real dollar expenditures did not change over the period 2006-2010. If, in fact, the horse population continued to grow over the period, as seems to be supported by results from a recent national survey of horse owners (American Horse Publications 2010), economic impact estimates will tend to understate the economic impact.

The assumption made here is that any likely increase in the horse population over the period 2006-2010 was offset by decreases in average horse expenditure because of the lingering effects of the recent recession on horse-owner purchase decisions. Therefore, the 2006 horse expenditures adjusted for inflation serve as a reasonable basis for computing horse operations impacts.

Table 3.1 provides a breakdown of expenditures of Virginia horse operations in terms of 2010 prices. The largest category of expenditure was for purchase and upkeep of horses. Within this category, some of the outlays are agricultural, such as the most costly expense, feed and bedding ($540 per horse) which is required for any horse. Some expenses, such as paid and contracted labor expenses ($373), are also important but are likely associated with larger breeding and stabling enterprises.

Virginia Horse Event Characteristics

Data on event attendance characteristics and financial aspects of hosting a show or competition were obtained from a formal survey of a sample of horse event

1 These deflators are based on Bureau of Economic Analysis sectoral deflators and projected deflators based on implicit output deflators derived from the Bureau of Labor Statistics growth model (Minnesota Implan Group (MIG), Inc.). http://www.implan.com/V4/index.php?option=com_multicategories&view=article&id=656:656&Itemid=10)

Table 3.1 Virginia Horse Operations Expenditures, 2010

Expenditure	Total Expenditure	Average per Operation	Average per Horse
Purchases and upkeep			
Feed and bedding	$116,019,108	$2,830	$540
Equipment purchases	$97,925,384	$2,388	$455
Horse purchases	$72,831,744	$1,776	$339
Veterinarian/health	$69,519,456	$1,696	$323
Boarding	$45,424,532	$1,108	$211
Training fees	$44,546,252	$1,086	$207
Farrier services	$40,906,896	$998	$190
Taxes	$39,149,716	$955	$182
Maintenance repair expenses	$41,272,960	$1,007	$192
Breeding fees	$26,490,690	$646	$123
Insurance premiums	$18,406,824	$449	$86
Tack	$16,174,441	$394	$75
Utilities	$12,784,672	$312	$59
Rent and lease expenditures	$13,077,504	$319	$61
Grooming supplies	$11,280,790	$275	$52
Horse related activities			
Travel and lodging	$23,167,997	$565	$108
Advertising expenses	$4,699,315	$115	$22
Professional fees	$4,536,664	$111	$21
Miscellaneous expenses	$7,408,176	$181	$34
Labor and capital improvements			
Capital improvements	$87,149,952	$2,126	$405
Paid labor	$71,889,656	$1,753	$334
Other contracted labor expenses	$8,330,441	$203	$39
Total	$872,993,169	$21,293	$4,060

Source: National Agricultural Statistics Service (2008) and deflators from IMPLAN

managers drawn from a sample. To develop a sampling frame for the event manager survey, a comprehensive listing of events held in the state during calendar year 2010 was constructed.[2] The manner in which this list was assembled is explained further in **Appendix A.2**. One hundred and fifty events were randomly selected from the list for survey using a stratified sampling methodology described in **Appendix A.3**. The survey involved an initial mail survey, a post-card reminder for non-responders, a second mailing of the original survey for non-responders, and a telephone follow-up for non-responders. The survey instruments and cover letters are provided in **Appendix A.4**. The survey instrument was developed by drawing on show manager surveys used by the Wessex Group (2003) and Deloitte Consulting (2005). The survey asked for event attendance and for expenditures and revenues by major category. Completed surveys were received for 42 events. After accounting for cancellations, the adjusted response rate was 29 percent.

2 The event inventory gradually increased throughout the year as more event calendars were released. The initial event inventory available in July for sampling horse events for on-site visits was 952. The event inventory constructed by October for sampling horse event sponsors was 1,099. The final event inventory used for weighting purposes here was 1,193.

Table 3.2 Virginia Event Manager Revenues and Operating Expenses, 2010

Item	Amount	Share
Revenues		
Admissions, parking and programs	$1,657,627	6.7%
Sponsors and advertising	$5,250,921	21.0%
Entry, registration and showing fees	$12,805,910	51.3%
Stall rentals	$3,941,880	15.8%
Concessions and vending	$1,022,508	4.1%
Other revenue	$279,181	1.1%
Total	$24,958,027	100.0%
Expenses		
Cash prizes, trophies and awards	$5,193,409	29.1%
Maintenance of facilities	$1,284,886	7.2%
Rental of equipment, vehicle and facility	$5,055,282	28.3%
Salaries, wages and benefits paid	$4,422,377	24.7%
Donations to charity	$702,315	3.9%
Other expenses	$1,218,266	6.8%
Total	$17,876,535	100.0%

Source: Center for Economic and Policy Studies, Weldon Cooper Center for Public Service

Weighted survey results indicate that the horse shows and competitions generated approximately $25 million in total revenue (see **Table 3.2**). Over half of this total was derived from entry, registration and showing fees. Sponsors and advertising was the second largest category, accounting for 21 percent of the total, followed by stall rentals at 16 percent. Equine event expenses totaled approximately $17.9 million. Cash prizes, trophies and awards were the largest expense item at 29 percent of total followed by rental of equipment and facilities (28 percent), and salaries and wages (25 percent). Equine events also produced estimated donations of over $700 thousand. The vast majority of show and competition revenues were retained within Virginia and much of it in the localities where the event was hosted. All of the event managers reported being residents of Virginia and nearly 80 percent lived in the locality where the event was hosted (see **Table 3.3**). Thirty-five percent of the estimated 5,207 employees and 32 percent of the estimated 2,782 vendors were residents of the locality in which the event was hosted while 76 percent and 68 percent, respectively, were residents of Virginia.

Table 3.3 Residency Characteristics of Managers, Vendors and Employees at Virginia Horse Events, 2010

	Percentage by Place of Residence		
Residence	Managers	Employees	Vendors
In-county	79.6%	35.4%	32.4%
Other in-state	20.4%	40.8%	35.3%
Out-of-state	0.0%	23.8%	32.3%

Source: Center for Economic and Policy Studies, Weldon Cooper Center for Public Service

Estimates for horse show and competition attendance were made on the basis of horse event manager surveys weighted by event size categories. **Table 3.4** shows estimates of horse show and competition attendance. An estimated duplicated headcount of 938,871 attended Virginia horse show and competitions during 2010. The term "duplicated" is used because many attendees included in this count may have been at more than one event.

Of the headcount, 131,417 were show and competition participants. An additional 367,422 were members of the participant travel party. An estimated 440,032

Table 3.4 Virginia Horse Show and Competition Attendance Estimates, 2010

Category/Type	Number
Attendees	
In-county	428,287
Other in-state	379,554
Out-of-state	131,031
Total	938,871
Employees	5,207
Vendors	2,782

Source: Center for Economic and Policy Studies, Weldon Cooper Center for Public Service

individuals attended as event spectators. Of this number, 182,654 people (42 percent) attended steeplechase races. Nearly 46 percent of attendees were drawn from the locality in which the event was held. Another 40 percent came from elsewhere in Virginia. Fourteen percent were out-of-state residents.

Attendance for Colonial Downs and each OTB facility was obtained from Colonial Downs (see **Table 3.5**). No attendance figures are available for the two new off-track betting parlors, which are located in private restaurants and opened in mid-2010. Finns McCoole in Henrico County opened in May and Mulligans in Richmond City opened in August. Gateway racing attendance at Colonial Downs during the Thoroughbred and Harness seasons was 74,272. Of this total, an estimated 9.9 percent resided locally, 79.5 percent from elsewhere in the state, and 10.6

Table 3.5 Virginia Pari-mutuel Racing and OTB Attendance, 2010

Racing/OTB Facility	Locality	Attendance, 2010
Colonial Downs (Thoroughbred and Harness seasons)	New Kent County	74,272
In-county		7,353
Other in-state		59,046
Out-of-state		7,873
Off Track Betting (OTB)	Various Locations	325,222
In-county		106,022
Other in-state		147,326
Out-of-state		71,874
Alberta	Brunswick County	15,442
Chesapeake Indian	Chesapeake City	71,909
Hampton	Hampton City	61,231
Finns McCoole	Henrico County	N/A
Martinsville	Martinsville City	21,679
Mulligans	Richmond City	N/A
Richmond Broad	Henrico County	75,218
Richmond Hull	Richmond City	40,662
Scott	Scott County	13,637
Vinton	Roanoke County	25,444

Source: Colonial Downs and Center for Economic and Policy Studies, Weldon Cooper Center for Public Service

Table 3.6 Virginia Horse Event Interview Schedule, 2010

Event	Location	Number of Interviews	Date of Interviews
Showday National	Commonwealth Park, Culpeper	74	July 9
Arabian Horse Association Region 15	Virginia Horse Center, Lexington	161	July 10
Thoroughbred Race Day	Colonial Downs, New Kent	100	July 21
AA Horse Show—Deep Run	Deep Run Hunt Club, Manakin-Sabot	42	July 25
Eastern Shore Rural Health	In Remembrance Farm, Nassawadox	21	July 31
Lexington National Horse Show "AA"	Virginia Horse Center, Lexington	122	August 15
Dressage at Foxcroft	Foxcroft School, Middleburg	43	August 22
Martinsville OTB Simulcast Racing	Martinsville	33	October 8
Richmond OTB Simulcast Racing	Richmond	53	September 3
Summerplace Farm Horse Show	Summerplace Farm, The Plains	54	September 11
Virginia Beach Horse Show Association Show	East Coast Equestrian Center, Virginia Beach	39	October 3
Harness Season Race	Colonial Downs, New Kent	65	October 9
Total		808	

Source: Center for Economic and Policy Studies, Weldon Cooper Center for Public Service

percent from out-of-state. For the eight OTB locations where tallies were available, 325,222 attended. Of this total, 32.6 percent resided in the county where the OTB was located, 45.3 percent resided elsewhere in the state, and 22.1 percent came from out-of-state.

Participant, Bettor, and Spectator Expenditures

Information on attendance characteristics and spending patterns was obtained from surveys of horse event attendees conducted by on-site interviewers at eight randomly sampled horse shows and competitions and four pari-mutuel events (see **Table 3.6**). Patrons and participants were interviewed at a thoroughbred racing event during the summer and a harness racing event during the fall. The events were selected to be representative of the racing schedule, which is split into two distinct seasons. In addition, patrons at two off-track betting facilities were surveyed. One of the locations selected for interviews (Richmond OTB) was an interior location while the other was closer to the North Carolina border (Martinsville OTB). The show and competition list was based on a stratified sample selected along the dimensions of the four major categories of discipline (i.e., hunter/jumper, dressage, western and other), expected size of event, and location (i.e., southern, western, northern and eastern). Specific details on the sampling method are described in **Appendix A.3**.

The survey instruments (see **Appendix A.5**) were developed based on an attendee survey instrument used in the previous Virginia horse industry study (Wessex Group 2003) and visitor instruments used in a study of the economic impact of the Virginia Horse Center (Knapp and Barchers 2001a) and Monticello (Knapp and Barchers 2001b). The survey asked respondents to identify their reason for attending the event (e.g., spectator, rider or owner, trainer, staff), residency zip, length of stay, size of travel group, expenditures made by location, and demographics. The surveys resulted in 808 completions. Five hundred and fifty seven completions were obtained from horse show and competition visitors and 251 were received from pari-mutuel race activity visitors. The following analysis of results focuses on two groups of respondents most pertinent to estimating visitor expenditures: riders/owners (active participants) and spectators.

The attendance, demographics and spending patterns of racetrack, OTB, and horse show and competition patrons differ in several significant ways. Over four-fifths of Colonial Downs and horse show and competition visitors were visiting the area expressly to attend

the event, while three-fifths were there to visit the OTB (see **Table 3.7**). In addition, rider/participants made up a large share (one-third) of attendees at horse show and competitions. Horse show and competition attendees were more likely to be younger, female, and college educated than pari-mutuel attendees. They were also more likely to have resided out-of-state. Almost one in three OTB attendees were residents in the county in which the OTB was located.

Travel parties characteristics, visitation lengths, and travel expenditure patterns for horse show/competition and pari-mutuel attendees are detailed in Tables 3.8-3.10. Travel parties for in-state and out-of-state spectators were similar at slightly larger than 3 people per party. As shown in **Table 3.8**, Colonial Downs spectators from in-state were generally "day trippers" who travelled to the area for the races. An analysis of ZIP code data indicates that 68.1 percent were drawn from the Richmond Metropolitan Statistical Area. Their largest category of expenditure was wagers followed by food and drink. Total average non-wager spending was $94. Excluding wagers, 71 percent of their expenditures were made at the track, 23 percent in the New Kent area, and 6 percent elsewhere in the state. Out-of-state residents expected to spend 5.4 days in Virginia. Because they stayed more than one night, they tended to spend much more on accommodations, entertainment, and food and drink for a total of $413 non-wagering spending. Eighteen percent of the spending was at the track, 54 percent in the New Kent area and 29 percent elsewhere in the state. Colonial Downs participants had much larger expenditures because of higher average stays and expenses associated with horse care and stabling. In-state participants reported non-wager spending slightly more ($6,175) than out-of-state participants ($5,444).

Off-track betting parlor visitors generally reported higher wagers but smaller parties, shorter stays, and much lower non-wager spending (see **Table 3.9**). The typical in-state patron was a resident of the local region and had a travel party of 1.5 people. Average non-wager spending was $49 of which 64 percent was at the OTB,

Table 3.7 Virginia Horse Event Attendance Characteristics, 2010

		Percentage		
Item	Category	Colonial Downs	OTB	Show/Competition
Visiting for event?	Yes	81.5	59.3	81.1
	No	18.5	40.7	8.9
Reasons for attendance:	Participant	7.8	0.0	66.8
	Spectator	92.2	100.0	33.2
Age:	Under 25	3.9	1.2	9.1
	25-44	23.3	28.4	29.9
	45-64	53.5	50.6	54.5
	65 or older	19.4	19.8	6.5
Education:	Some High School	0.0	0.0	4.1
	High School	11.7	25.6	9.5
	Some College	28.9	42.3	22.2
	Bachelor's Degree	30.5	17.9	35.8
	Graduate Degree	28.9	14.1	28.4
Gender:	Male	59.4	81.9	20.6
	Female	40.6	18.1	79.4
Residence:	In-county	9.9	32.6	16.4
	In-state, out-of-county	79.5	45.3	50.4
	Out-of-state	10.6	22.1	33.2

Source: Center for Economic and Policy Studies, Weldon Cooper Center for Public Service

Table 3.8 Colonial Downs Respondent Travel and Expenditure Characteristics, 2010

Expenditure	In-State Residents		Out-of-State Residents	
	Participants (n=7)	Spectators (n=128)	Participants (n=5)	Spectators (n=11)
Tourist expenditures				
Wagers	$887	$103	$120	$34
Spectator admission fees, parking, and program	$0	$25	$0	$7
Food and drink	$244	$34	$980	$60
Lodging	$0	$3	$1,160	$78
Entertainment	$0	$7	$680	$151
Gifts, souvenirs, clothing, etc.	$24	$5	$300	$61
Travel	$114	$14	$680	$47
Car Rental	$0	$2	$0	$9
Other	$1	$4	$0	$0
Participant expenditures				
Entry, registration, showing fees	$79	N/A	$340	N/A
Stall or boarding fees	$214	N/A	$0	N/A
Feed and bedding	$2,414	N/A	$430	N/A
Horse care services	$2,257	N/A	$484	N/A
Tack and horse supplies	$764	N/A	$190	N/A
Other horse-relates expenses	$0	N/A	$0	N/A
Horse transport	$64	N/A	$200	N/A
Total	$7,062	$197	$5,564	$447
Exhibit				
Average number in travel party	3.9	3.2	2.8	3.1
Average number of days	20.3	0.8	48.8	5.4

Source: Center for Economic and Policy Studies, Weldon Cooper Center for Public Service

N/A = Not applicable.

n = Number in sample.

17 percent in the local area, and 19 percent elsewhere in the state. The average out-of-state resident patron had a travel party of 1.6 and had an expected stay of 3.6 days. Average non-wagers spending was $264. The largest category of spending was lodging ($100), followed by entertainment ($51) and food-and-drink ($50). Twenty-eight percent of non-wager spending was at the OTB, 38 percent in the local area, and the remaining 34 percent elsewhere in the state.

Horse show and competition attendees reported the highest spending levels of the three types of venues surveyed (see **Table 3.10**). In-state spectators had an average travel party of 2.8 people, stayed overnight for a 1.3 average day stay, and spent $181 dollars. Fifty-two percent was spent at the event, 42 percent in the area, and the remaining 6 percent elsewhere in the state. Out-of-state spectators stayed much longer (3.2 days) and had slightly larger travel parties (3.3). Their average travel expenses were $891 with the largest expense item being lodging ($353). Forty nine percent of total expenses were incurred at the event, while 37 percent occurred outside the event, and the remainder (14 percent) elsewhere in the state. Once again, participant expenses were much higher because of costs associated with horse transportation and care. In-state participants had an average party size of 3.8 and had a planned stay of 2.8 days. In-state participants spent an average of $1,590 with the bulk of this (64 percent) being on horse related expenses. Seventy-seven percent was spent on site, 16 percent in the area, and 7 percent elsewhere in the state. Out-of-state participants had slightly larger party sizes (3.9), much longer stays (5.2) and spent nearly twice as much ($3,106). A slightly smaller percentage of expenditures (59 percent) was horse related. Sixty-nine percent of expenditures were made at the event, 25 percent in the area, and 6 percent elsewhere in the state.

Table 3.9 Virginia OTB Respondent Travel and Expenditure Characteristics, 2010

Expenditure	In-State Residents (n=64)	Out-of-State Residents (n=19)
Wagers	$153	$276
Spectator admission fees, parking and program	$14	$8
Food and drink	$13	$50
Lodging	$0	$100
Entertainment	$8	$51
Gifts, souvenirs, clothing, etc.	$9	$0
Travel	$4	$34
Other	$1	$21
Total	$202	$540
Exhibit		
Average number in travel party	1.53	1.58
Average number of days	1.09	3.63

Source: Center for Economic and Policy Studies, Weldon Cooper Center for Public Service
n = Number in sample.

Table 3.10 Virginia Horse Show and Competition Respondent Travel and Expenditure Characteristics, 2010

Expense Category	In-State Residents		Out-of-State Residents	
	Participants (n=151)	Spectators (n=93)	Participants (n=93)	Spectators (n=28)
Tourist expenditures				
Spectator admission fees, parking, and program	N/A	$11	N/A	$15
Food and drink	$178	$56	$357	$234
Lodging	$232	$50	$527	$353
Entertainment	$18	$6	$37	$18
Gifts, souvenirs, clothing, etc.	$52	$25	$142	$77
Travel	$70	$24	$186	$106
Car Rental	$0	$1	$22	$20
Other	$22	$8	$6	$68
Participant expenditures				
Entry, registration, showing fees	$469	N/A	$878	N/A
Stall or boarding fees	$177	N/A	$262	N/A
Feed and bedding	$66	N/A	$120	N/A
Horse care services	$105	N/A	$153	N/A
Tack and horse supplies	$63	N/A	$156	N/A
Horse Transport	$52	N/A	$33	N/A
Other horse-relates expenses	$86	N/A	$78	N/A
Total	$1,590	$181	$2,983	$891
Exhibit				
Average number in travel party	3.8	2.8	3.9	3.3
Average number of days	2.8	1.3	5.2	3.2

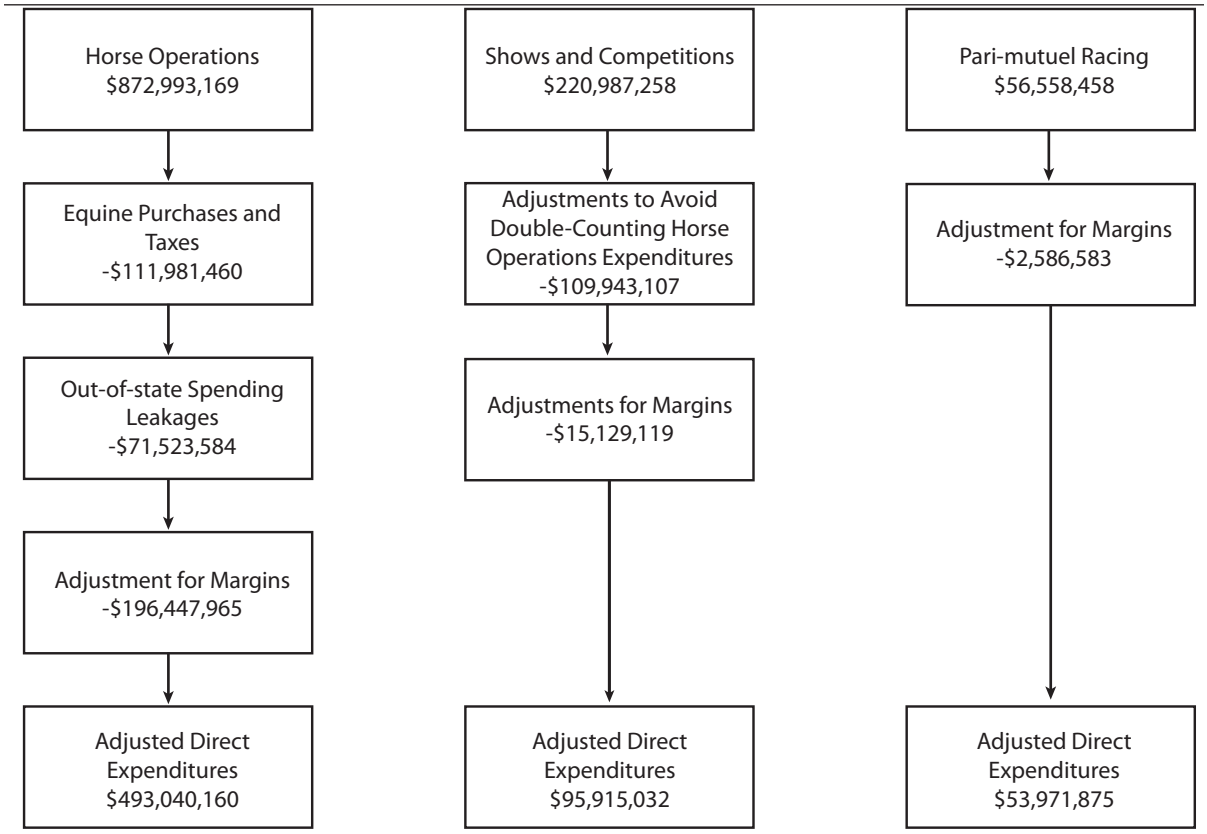
Source: Center for Economic and Policy Studies, Weldon Cooper Center for Public Service
n = Number in sample.
N/A = Not applicable.

Direct Expenditures

Direct expenditures on the horse industry were constructed using information compiled from the surveys described above. **Figure 3.1** summarizes the methodology for each component of the industry. It also shows how adjustments were made at each stage to avoid double counting, to remove out-of-state spending leakages, and to adjust for margins. Unlike the treatment other sectors in an input-output analysis, retail trade, wholesale trade, and transportation expenditures in an input-output analysis are based on purchase prices rather than production prices. Therefore, margining is done to convert purchase prices to production prices. This involves re-assigning most of the expenditures to the producing industries and retaining only a portion (the "margin") for retail trade, wholesale trade, or transportation.

Figure 3.1 shows that the starting point for estimating the impact of horse operations was information from the NASS equine survey on total horse owner expenditures which is equivalent to $873 million in terms of 2010 dollars. Adjustments were made to exclude taxes. Also horse purchases were excluded because in-state purchases would already be reflected in horse operations expenditures for maintenance and support of the horses sold. Next, the purchases of out-of-state goods and services were computed based on unpublished Virginia equine survey data obtained by agreement with NASS. Lastly, retail trade, wholesale

Figure 3.1 Horse Industry Study Methodology for Estimating Direct Expenditures by Component



trade, and transportation expenditures were margined. The result of these adjustments was an adjusted direct expenditure of $493 million, which was entered into the IMPLAN model.

For estimating show and competition direct expenditures, attendance information from the horse event sponsor surveys was combined with participant and spectator expenditure information from the horse event attendance surveys to estimate total direct expenditures of $221 million. Since the NASS Equine Survey of horse operations already includes horse-related expenditures on horse shows and other activities, only those expenditures made by in-state horse owners on selected other "tourist" expenses likely not considered by respondents to that survey were included (e.g., entertainment, gifts) in order to minimize the possibility of double counting. That means that all other expenditures (i.e., expenditures of all spectators, and horse and non-horse related expenditures of out-of-state resident participants) were counted. Next adjustments were made for margins. These adjustments resulted in a total adjusted direct expenditure of $95.9 million, which was entered into the IMPLAN model.

For estimating pari-mutuel racing direct expenditures, attendance and operations information from Colonial Downs was combined with expenditure data from the horse race and off-track betting parlor attendance surveys. Colonial Downs furnished employment and payroll information, which was used to estimate annual direct sales of $43.5 million for the Colonial Downs Racetrack (included in IMPLAN sector 403 "Spectator Sports") and OTBs (included in IMPLAN sector 409 "Amusement parks, arcades, and gambling industries"). Pari-mutuel racing patron direct expenditures outside the racetrack and OTBs were estimated at $13.1 million. This was revised downward to $10.5 million after margining. Therefore, total adjusted direct expenditures were estimated to be $54 million, which was entered into IMPLAN.

The expenditure categories used in the NASS and Cooper Center surveys were fairly broadly defined. In order to assign the expenditures to representative IMPLAN sectors (e.g., equipment purchases were divided into agricultural and automotive equipment categories), information from Virginia Cooperative Extension (Eberly 2008) and University of Kentucky Cooperative Extension equine budgets (Burdine and Coleman 2006) was used. Additional expenditure categories were assigned using weights based on IMPLAN data and professional judgment as well.

Estimates of direct expenditures were also made for localities in order to estimate economic impacts at this finer geographical level. These estimates were based on revised direct expenditure estimates. Two major adjustments were made to the methodology described above. First, the NASS equine survey contains only estimates of out-of-state purchases. But, from the vantage point of a locality, all out-of-locality spending should be counted as expenditure leakages. In a survey of Texas horse owners, Gibbs, Moyer, and Martin (1997) find that approximately 60 percent horse-related spending occurs in the county where the owner resides. In contrast, a Montgomery County, Maryland study (Montgomery Soil Conservation District 2004) finds that 78 percent of spending occurs in the county where the owner resides. By multiplying the Virginia in-state horse expenditures by a factor of 75 percent, one obtains an in-locality expenditure of approximately 68 percent, which is an in-county expenditure percentage value between the values found in the two studies. Therefore, this adjustment factor was used to transform the statewide expenditures to locality expenditures. Second, all out-of-county horse participant horse-related expenditures are counted as injections of spending into the locality.

SECTION 4
ECONOMIC IMPACT RESULTS

Total Economic and Fiscal Impacts

Table 4.1 shows the total economic impacts of the Virginia horse industry, which reflects the combined effects of direct, indirect, and induced spending. The industry is a significant source of commonwealth economic activity, accounting for 16,091 jobs in 2010. The labor income impact was $502.4 million. The value-added impact (which includes labor income, property income such as interest, rent and profits, and indirect business taxes) is $669.8 million. The value-added figure is directly comparable to gross domestic product. The total sales impact (which includes intermediate sales as well as sales for final demand) is $1.202 billion.

Table 4.1 Virginia Total, Direct, Indirect and Induced Impacts of Horse Industry, 2010

Impact	Employment	Labor Income	Value-added	Total Sales
Direct	12,098	$323,567,325	$347,346,016	$642,927,067
Indirect	1,288	$66,090,711	$108,945,789	$198,293,499
Induced	2,705	$112,752,202	$213,529,230	$360,795,434
Total	16,091	$502,410,239	$669,821,036	$1,202,016,001

Source: Center for Economic and Policy Studies, Weldon Cooper Center for Public Service

Table 4.2 shows the fiscal impacts of the Virginia horse industry. Further details about the methodology and calculations are provided in Appendix A.1. According to these estimates, the Virginia horse industry accounted for $65.3 million in total state and local taxes in 2010. State taxes are estimated at $37.5 million. Of this total, the largest portion is from the individual income tax ($18.5 million) followed by the sales and use tax ($9.2 million). Other taxes (e.g., corporate income taxes, motor fuels) amount to $7.9 million. Pari-mutuel racing license revenues were $1.9 million. Local government taxes are estimated at $27.8 million. The largest category is "other taxes" ($20.9 million) of which real property taxes form the largest part. The local options sales and use tax and meals tax each brought in more than $2 million dollars. Pari-mutuel revenues were $911 thousand.

Table 4.2 Impact of Horse Industry on State and Local Taxes, 2010

Tax Source	Impact
State taxes	
Sales and use tax, 4% rate	$9,156,020
Individual income tax	$18,538,938
Pari-mutuel wagering revenue	$1,866,956
Other state taxes (corporate income, motor fuels, etc.)	$7,903,888
Total	$37,465,802
Local taxes	
Local option sales and use tax, 1% rate	$2,289,005
Meals tax	$2,233,027
Lodgings tax	$1,495,075
Pari-mutuel wagering revenue	$911,104
Other local taxes (property, business license, etc.)	$20,898,416
Total	$27,826,627
Total state and local taxes	$65,292,429

Sources: Center for Economic and Policy Studies, Weldon Cooper Center for Public Service and the Virginia Racing Commission

The impacts of the Virginia horse industry were felt in various sectors of the economy (see **Table 4.3** and **Figure 4.1**). The largest effects in terms of employment were in the agriculture and service sectors. Also experiencing large economic effects were trade and construction. The direct effects of industry purchases were dominant in agriculture (which includes farming as well as agricultural support services such as farriers and groomers) and construction. Services and retail sector impacts reflect the direct effects of industry spending as well as indirect and induced effects.

Economic Impact by Industry Component

Table 4.4 presents the economic impact of the Virginia horse industry for each major component—horse operations, shows and competition, and pari-mutuel racing. The largest component of impact is related to the expenditures of

Table 4.3 Virginia Total Impact of Horse Industry by Major Sector, Employment, Labor Income, Value-added, and Sales, 2010

	Employment	Labor Income	Value-added	Sales
Agriculture	7,119	$152,177,873	$124,698,014	$205,089,477
Mining	5	$571,933	$1,174,364	$1,981,100
Construction	1,146	$65,208,628	$68,849,726	$129,891,060
Manufacturing	70	$4,216,756	$7,449,496	$34,017,800
TIPU[a]	260	$19,644,809	$40,816,134	$79,373,165
Trade	1,524	$54,501,233	$88,732,713	$138,482,866
Service	5,890	$200,761,742	$332,358,495	$599,947,480
Government	77	$5,327,265	$5,742,094	$13,233,053
Total	16,091	$502,410,239	$669,821,036	$1,202,016,001

Source: Center for Economic and Policy Studies, Weldon Cooper Center for Public Service

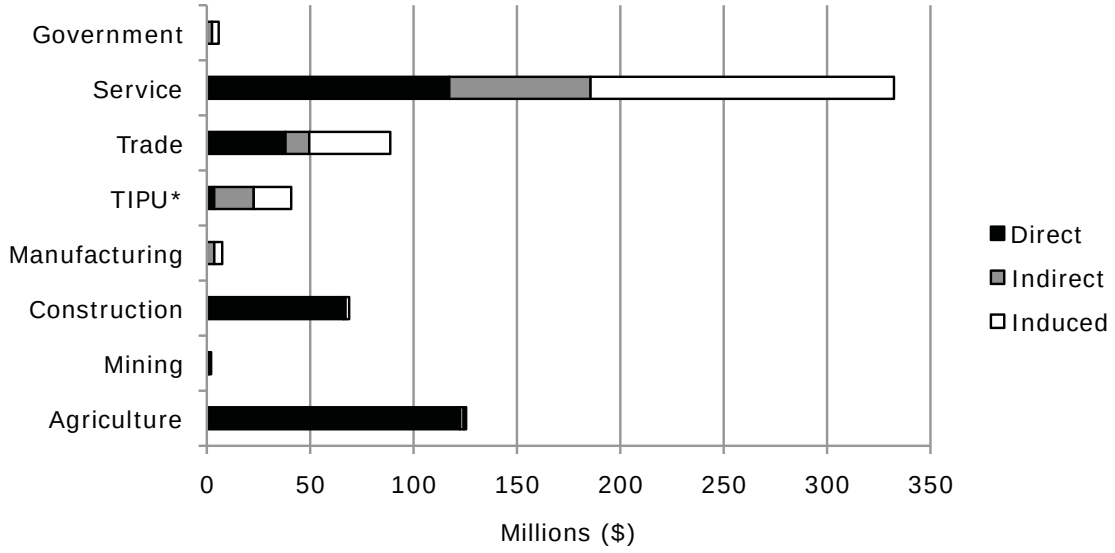
[a] Transportation, Information, and Public Utilities

Virginia horse owners. As described in the previous section, this component includes the expenditures of Virginia owners on horse-related expenses but does not include associated tourism expenditures of in-state residents and expenditures of out-of-state visitors related to shows and competitions. In addition, this component does not include the expenditures of the state's pari-mutuel facilities or pari-mutuel visitor spending outside of the racetrack and OTBs.

As shown in **Table 4.4**, horse operations account for 12,685 jobs, $410.1 million in labor income, $526.1 million in value-added, and $926.3 million in total sales. Shows and competitions account for 2,294 jobs, $59.3 million in labor income, $92.6 million in value-added, and $172.6 million in total sales. Pari-mutuel racing activities have an economic impact of 1,112 jobs, $32.9 million in labor income, $51.1 million in value-added, and $103.2 million in total sales.

The pari-mutuel economic impact can be further disaggregated. For instance, of the total employment impact, 632 jobs are directly related to Colonial Downs and the 10 regional OTB operations. Another 285 jobs represent the indirect and induced jobs impacts of the

Figure 4.1 Distribution of Virginia Direct, Indirect, and Induced Value-added Impacts by Sector, 2010



Source: Center for Economic and Policy Studies, Weldon Cooper Center for Public Service

* Transportation, information, and public utilities

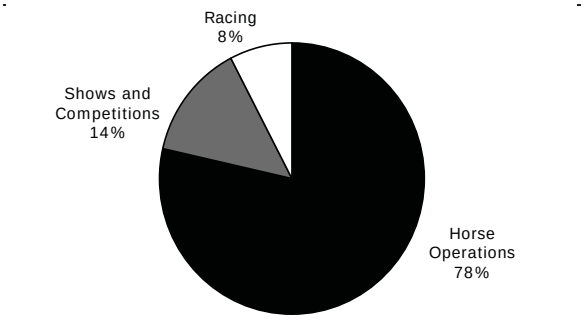
Table 4.4 Virginia Total, Direct, Indirect, and Induced Impacts of Horse Industry by Component, 2010

Component	Employment	Labor Income	Value-added	Total Sales
Horse operations				
Direct	9,572	$271,980,160	$274,890,100	$493,040,160
Indirect	844	$43,598,692	$72,159,660	$130,624,128
Induced	2,269	$94,568,840	$179,096,100	$302,613,984
Total	12,685	$410,147,692	$526,145,860	$926,278,272
Shows and competitions				
Direct	1,756	$35,023,928	$49,045,340	$95,915,032
Indirect	258	$12,609,251	$21,396,830	$39,227,388
Induced	280	$11,692,139	$22,141,650	$37,412,448
Total	2,294	$59,325,318	$92,583,820	$172,554,868
Pari-mutuel racing				
Direct	770	$16,563,237	$23,410,576	$53,971,875
Indirect	186	$9,882,768	$15,389,299	$28,441,983
Induced	156	$6,491,223	$12,291,480	$20,769,002
Total	1,112	$32,937,229	$51,091,356	$103,182,861
Total				
Direct	12,098	$323,567,325	$347,346,016	$642,927,067
Indirect	1,288	$66,090,711	$108,945,789	$198,293,499
Induced	2,705	$112,752,202	$213,529,230	$360,795,434
Total	16,091	$502,410,239	$669,821,036	$1,202,016,001

Source: Center for Economic and Policy Studies, Weldon Cooper Center for Public Service

pari-mutuel operations. The residual employment impact of 195 is due to the direct, indirect and induced impacts of tourism-related expenditures outside the racetracks and OTBs.

Figure 4.2 Distribution of Value-added Impacts by Component, 2010



Source: Center for Economic and Policy Studies, Weldon Cooper Center for Public Service

Figure 4.2 illustrates the component distribution of value-added impacts. Value-added is a preferable measure of the contribution of the industry to the economy because it measures the addition to output (unlike labor income which measures only payments to labor) but avoids the double counting of the value of intermediate inputs that occurs in using a measure such as total sales. Seventy-eight percent of value-added is related to Virginia horse operations, 14 percent to shows and competitions, and 8 percent to racing.

Impact by Locality

Impacts were estimated for each of Virginia's localities using a Bureau of Economic Analysis locality geographical classification. The employment impacts are illustrated in **Figure 4.3**. **Table 4.5** provides total economic impacts for employment, value-added, total sales, and local taxes. The cumulative impacts do not add up to the statewide totals because only those horse

Figure 4.3 Total Employment Impact of Virginia Horse Industry by Locality, 2010

Source: Center for Economic and Policy Studies, Weldon Cooper Center for Public Service

Table 4.5 Economic and Fiscal Impacts of Virginia Horse Industry by Locality, 2010

Locality	Employment	Value-added	Total Sales	Tax Revenue
Accomack	34	$817,911	$1,502,206	$25,046
Albemarle and Charlottesville City	538	$18,760,123	$31,810,840	$842,330
Alexandria	0	$0	$0	$0
Alleghany and Covington City	27	$778,347	$1,329,334	$32,809
Amelia	74	$1,652,745	$3,082,717	$55,896
Amherst	85	$2,181,002	$3,814,781	$86,620
Appomattox	43	$818,019	$1,571,807	$30,547
Arlington	0	$0	$0	$0
Augusta and cities of Staunton and Waynesboro	293	$8,968,285	$15,749,054	$303,879
Bath	17	$490,662	$833,577	$18,801
Bedford and Bedford City	398	$8,903,747	$16,501,721	$388,398
Bland	24	$627,222	$1,058,419	$17,041
Botetourt	115	$3,671,648	$6,210,707	$133,429
Brunswick	72	$2,052,792	$4,634,522	$93,029
Buchanan	9	$226,758	$384,441	$10,346
Buckingham	60	$1,305,672	$2,426,744	$55,859
Campbell and Lynchburg City	129	$3,862,234	$6,759,149	$107,138
Caroline	53	$1,269,574	$2,252,493	$69,354
Carroll and Galax City	110	$2,917,963	$5,198,827	$101,359
Charles City	16	$397,052	$655,463	$19,433
Charlotte	45	$1,059,896	$1,981,262	$35,040
Chesapeake	271	$10,384,889	$19,828,197	$761,173
Chesterfield	133	$5,010,665	$8,639,431	$235,805

Table 4.5 Economic and Fiscal Impacts of Virginia Horse Industry by Locality, 2010 (continued)

Locality	Employment	Value-added	Total Sales	Tax Revenue
Clarke	336	$12,239,654	$20,451,415	$608,963
Craig	23	$487,903	$921,799	$19,429
Culpeper	716	$20,815,563	$38,201,164	$1,108,299
Cumberland	24	$674,074	$1,144,873	$29,122
Dickenson	8	$214,917	$349,368	$13,274
Dinwiddie and cities of Colonial Heights and Petersburg	99	$3,040,618	$5,263,866	$113,916
Essex	18	$530,367	$920,322	$23,490
Fairfax and cities of Fairfax and Falls Church	469	$15,131,534	$26,329,507	$639,952
Fauquier	883	$31,727,017	$53,676,492	$2,113,116
Floyd	82	$1,930,414	$3,712,840	$89,317
Fluvanna	123	$2,900,832	$5,028,750	$199,397
Franklin	78	$2,766,679	$4,665,405	$145,635
Frederick and Winchester City	166	$4,879,448	$8,499,769	$170,381
Giles	52	$1,334,663	$2,390,490	$40,198
Gloucester	52	$1,478,779	$2,618,640	$79,606
Goochland	176	$5,546,389	$9,408,643	$136,065
Grayson	90	$1,932,530	$3,507,851	$83,094
Greene	40	$1,034,962	$1,856,229	$73,473
Greensville and Emporia City	21	$494,023	$919,381	$12,596
Halifax	73	$2,005,006	$3,544,862	$63,013
Hampton	71	$2,861,311	$6,759,426	$226,709
Hanover	284	$10,190,591	$16,507,758	$499,306
Henrico	272	$11,331,069	$21,571,176	$468,647
Henry and Martinsville City	134	$4,196,213	$9,282,779	$148,282
Highland	21	$398,343	$733,501	$14,877
Isle of Wight	122	$3,651,587	$6,579,048	$208,852
James City and Williamsburg City	78	$2,159,517	$3,780,792	$103,044
King and Queen	47	$1,250,362	$2,275,105	$44,124
King George	41	$1,088,537	$1,974,875	$20,767
King William	36	$1,415,642	$2,324,279	$85,353
Lancaster	20	$604,653	$1,059,483	$24,495
Lee	119	$2,494,776	$4,805,263	$66,616
Loudoun	1,079	$44,154,154	$70,425,051	$2,890,422
Louisa	120	$4,054,413	$6,767,457	$126,219
Lunenburg	30	$747,648	$1,379,426	$19,471
Madison	118	$3,473,030	$6,048,513	$179,637
Mathews	10	$243,861	$462,945	$13,288
Mecklenburg	79	$2,155,361	$3,868,232	$67,097
Middlesex	52	$1,111,543	$2,070,962	$55,769
Montgomery and Radford City	176	$5,644,695	$9,632,158	$168,642
Nelson	59	$1,407,876	$2,564,696	$100,259
New Kent	789	$12,516,968	$28,185,674	$1,523,460
Newport News	4	$106,265	$196,266	$7,802
Norfolk	0	$0	$0	$0
Northampton	16	$349,208	$669,118	$16,870
Northumberland	17	$405,177	$713,501	$30,819
Nottoway	44	$1,148,853	$1,996,753	$24,574
Orange	268	$10,104,815	$16,518,479	$511,381
Page	112	$3,131,298	$5,646,799	$173,073

Table 4.5 Economic and Fiscal Impacts of Virginia Horse Industry by Locality, 2010 (continued)

Locality	Employment	Value-added	Total Sales	Tax Revenue
Patrick	71	$1,487,690	$2,952,954	$46,085
Pittsylvania and Danville City	157	$4,482,258	$7,941,972	$126,027
Portsmouth	0	$0	$0	$0
Powhatan	131	$3,535,446	$6,234,218	$239,512
Prince Edward	55	$1,754,669	$2,959,336	$52,826
Prince George and Hopewell City	71	$2,258,655	$3,840,836	$55,911
Prince William and cities of Manassas and Manassas Park	326	$11,951,779	$20,495,436	$874,803
Pulaski	81	$2,085,216	$3,779,403	$82,522
Rappahannock	77	$2,009,578	$3,591,170	$140,467
Richmond	7	$165,757	$285,319	$4,210
Richmond City	86	$4,809,012	$10,074,460	$240,662
Roanoke City	0	$0	$0	$0
Roanoke and Salem City	214	$6,751,268	$13,494,112	$336,651
Rockbridge and cities of Buena Vista and Lexington	1,331	$33,562,214	$61,461,773	$2,321,764
Rockingham and Harrisonburg City	227	$7,063,090	$12,383,572	$212,930
Russell	126	$3,143,611	$5,697,273	$95,830
Scott	223	$5,570,792	$11,580,569	$193,472
Shenandoah	139	$3,784,927	$6,830,609	$150,335
Smyth	125	$2,995,373	$5,497,319	$72,200
Southampton and Franklin City	42	$1,164,519	$2,127,793	$61,362
Spotsylvania and Fredericksburg City	269	$7,995,271	$14,649,210	$465,615
Stafford	46	$1,590,239	$2,642,361	$87,340
Suffolk	128	$4,093,292	$7,165,322	$317,715
Surry	7	$216,719	$352,846	$3,228
Sussex	43	$985,263	$1,800,069	$33,540
Tazewell	146	$4,221,922	$7,276,023	$109,456
Virginia Beach	242	$6,521,318	$12,078,179	$380,933
Warren	81	$2,483,244	$4,299,750	$114,495
Washington and Bristol City	332	$9,227,883	$16,252,099	$236,737
Westmoreland	8	$175,501	$312,542	$12,276
Wise and Norton City	25	$937,941	$1,556,506	$23,965
Wythe	117	$3,131,091	$5,480,909	$99,936
York and Poquoson City	77	$2,582,523	$4,419,750	$132,936
Total	15,299	$462,458,405	$823,950,563	$24,331,263

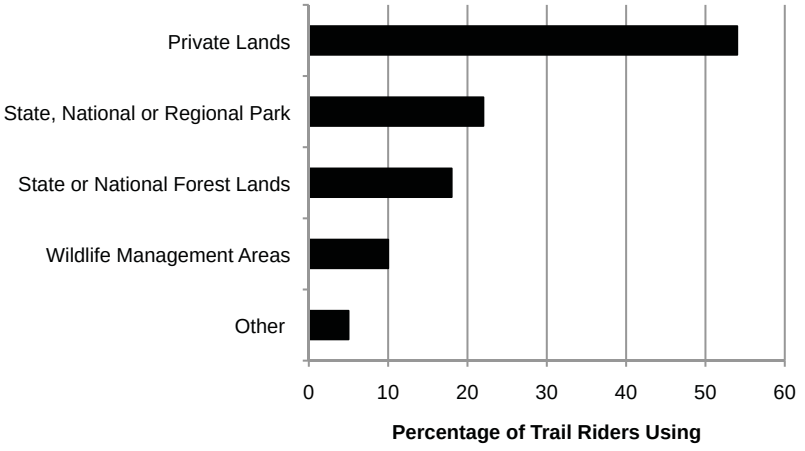
Source: Center for Economic and Policy Studies, Weldon Cooper Center for Public Service

industry expenditures that can be assigned by locality are counted as direct expenditures. Figure 4.3 shows that the largest concentration of economic impacts is in Northern Virginia. Indeed, Fauquier and Loudon counties each have over 800 jobs attributable to the horse industry. The largest employment impact, however, is found in Rockbridge County (including the cities of Lexington and Buena Vista) where an estimated 1,331 jobs are stimulated. This impact reflects the important role of the Virginia Horse Center, other horse shows and competitions held in the county, and a relatively large inventory of 3,700 horses. New Kent County, home to the Colonial Downs racetrack, which directly employs over 300 people during the Thoroughbred racing season, is another significant economic activity center with a total economic impact of 789 jobs.

SECTION 5
OTHER FINDINGS

The Virginia horse industry provides additional benefits and some costs that are not captured in the previous discussion, which only examined how flows of certain horse-related expenditures affect the economy. For instance, the economic impacts attributable to expenditures of out-of-state residents who visit Virginia for non-competitive pleasure and trail riding are not included, nor are the economic impacts of horse-related higher education programs. In addition, the impact estimates provided are not able to capture the wider social benefits and costs of horse-related activities and open-space preservation. However, some estimates of the magnitude of the contribution of these other activities are available from other studies. These impacts and social benefits and costs are discussed for the topics of trail and pleasure riding, the environment and rural economy, health/wellness, and higher education.

Figure 5.1 Virginia Horse Trail Riding Venues, 2006



Note: Total percentage exceeds 100 percent because repondents were allowed multiple responses.
Source: National Agricultural Statistics Service (2008)

Trail and Pleasure Riding

The most popular category of horse use in Virginia is recreational riding, including trail riding. Over 285 public access horse riding trails in the state support trail riding.[1] The previous analysis captures only the economic impacts of a portion of this important market--the expenditures of Virginia horse operations that cater to this market. Not included in the economic impact results are the horse tourism-related expenditures of resident and non-residents who do not own horses and the horse and tourism-related expenditures of out-of-state residents who bring their horses to Virginia for riding.

A survey of 822 Virginia resident horse owners conducted for the Virginia Horse Council (Kline and Aungier, 2008) suggests that the characteristics of trail riders are similar to horse show and competition participants. Approximately 88 percent are female and riders are concentrated in the middle-age bracket (72.2 percent are 41-60 years of age compared to 53.5 percent in the 45-64 age bracket for horse shows and competitions). Responders indicated that their usual trail-riding trip was a day trip (65.1 percent) with the remainder (34.9 percent) responding that they took multi-day trips. Many trail riders also participate in horse shows and competitions like hunter/jumper (20.7 percent), dressage (20.3 percent), western pleasure (16.2 percent), and foxhunting (16 percent). Most trail-riding occurs on private lands according to the National Agricultural Statistics Service (see **Figure 5.1**). However, publicly owned lands are also popular venues. **Table 5.1** shows some of the most popular specific destinations according to Kline and Aungier (2008). Approximately 6 to 9 percent of visitors at the George Washingon and Jefferson National Forests engage in horseback riding on trails, which was among the fastest growing outdoor recreation activities there (Overdevest and Cordell 2001a, b).

1 Virginia Horse Industry Board. http://www.vhib.org/virginia-horse-country.html

Table 5.1 Popular Virginia Trail Riding Venues, 2008

Venue	Number of Responses
National Battlefield Park, Manassas	114
Home	103
James River State Park	84
National Battlefield Park	80
Lake Anna State Park	68
Farm	62
Graves Mountain Trails, Syria	51
Private Property	51
Beaver Dam Park, Gloucester	46
Bull Run Regional Park	41
George Washington National Forest	39
Powhatan Wildlife Management Area	37

Source: Kline and Aungier (2008)

Nearly 80 percent of Virginia riders also indicated that they went on out-of-state riding trips. The reciprocal of this situation is that many out-of-state riders also visit Virginia, although a precise estimate is not available. Bordering states likely form an important part of visitorship. A survey of Kentucky trail riders found that trail riders travel an average of 66.36 miles one-way to arrive at their designated site which they visit 10.85 times per year and incur approximately $105 in travel expenses one-way each time (Blackwell et al. 2009). A study of the Knott Country 2008 Trail Ride, situated in Eastern Kentucky, found that 16 percent of participants resided out-of-state and that average expenditures amounted to $324.91 for a 3.5 day stay (Hackbert 2008). These expenditure estimates are much smaller than horse-related expenditures for horse shows and competitions. Still they have the potential to add up because of a relatively large number of participants. For instance, an economic impact study of horse camping in Southern Illinois found that 40 percent of respondents were from outside the region and that they accounted for $16 million in economic impact for the region (Kim, Hallab, and Smith 2008).

Environment and the Rural Economy

Virginia's horse industry is an important buttress for Virginia's rural economy and helps preserve open spaces and maintain the state's rural character and historical heritage. The horse industry, which includes farms that can be found throughout the commonwealth, creates demand for agricultural crops that use farm open space, and supports networks of trails and open spaces areas for horseback riding. The horse industry benefits the rural economy through the injection of horse related expenditures and its associated multiplier effects. These economic impacts can help to counter rural economic decline and reduce regional inequalities. Many of the jobs associated with the horse industry are also entry-level jobs for new job entrants.

A series of statistics helps to demonstrate the magnitude of open space contributions. While Virginia farms decreased in number from 49,366 to 47,383 from 1997 to 2007 according to Census of Agriculture statistics, the number of farms with horses actually increased during the same period from 10,972 to 13,520, thereby helping to offset more severe decline (U.S. Department of Agriculture, National Agricultural Statistics Service 2004, 2009). The amount of open space acreage preserved by horse farms is also significant. At least two acres per horse are generally recommended for raising horses (Pleasant and Currin 2009) though local zoning requirements may vary. If one conservatively estimated that the minimum area was used by all horse owners and operations for the 215,000 Virginia horse inventory, it would account for at least 430,000 open space acres or 671 square miles. Horse owners also spend money on locally made agricultural products. For example, they spent an estimated $99,648,000 on feed and bedding for horses in 2006 (U.S. Department of Agriculture, National Agricultural Statistics Service 2008). During the same year, Virginia farms harvested 1,240,000 acres of hay for a total production value of $275,220,000 or a value of $222 per planted acre. If one assumes that only half (or $49,824,000) of the feed and bedding amount was spent on local hay and the other half on other non-local feeding supplies (e.g., mixed feed, salt and minerals), it would account for an additional 224,432 acres of Virginia agricultural land ($49,824,000/$222). The sum of the two acreages is 654,432 acres (1,023 square miles) statewide or 2.6 percent of Virginia's total land area of 39,594 square miles. This total does not count additional public and private land preserved as open space for riding and competitions.

According to Ready, Berger and Blomquist (1997), preserved horse farmland confers amenity benefits to non-farm dwellers. However, horse activity and operations may sometimes impose social costs as well. Horses are a type of livestock and therefore require best management practices used in other types of agriculture (e.g., manure management, off-stream watering with fencing) to minimize environmental impacts such as surface run-off and groundwater pollution. Surveys of horse operations conducted outside of Virginia indicate that some horse operations, particularly smaller and non-commercial ones, have not yet adopted best management practices (Montgomery County Soil Conservation District 2004; Swinker et al. 2003). Concerns have also been expressed about the environmental effects of intensive trail riding in ecologically sensitive areas (Broadway, et al. 1994). A paper by Duel (1999) describes other potential land use conflicts that can arise when residential areas and horse operations are in close proximity.

Health and Wellness

Horse activities provide many physical, psychological and other therapeutic benefits. In an era when obesity and the costs of obesity-related health problems continue to mount, equine activities contribute to improved fitness. Moreover, horse-related activities such as 4-H, pony clubs, and therapeutic riding can help build children's self-confidence and physical agility and teach responsibility and better citizenship. Some horse activities such as pari-mutuel gambling, however, may create social costs along with the benefits. For instance, problem or pathological gambling can lead to increased alcohol abuse, depression, bankruptcy, and crime (Thompson, Gazel and Rickman 1997). However, the structural characteristics of pari-mutuel betting with contests being decided at less frequent intervals than say, casino style gambling, may make it less addictive than alternative gambling forms (Griffiths 1999).

Higher Education

Several Virginia higher education institutions offer horse study programs and even more offer horse sports activities. These distinctive programs and activities are important for attracting out-of-state students and retaining in-state students who are interested in equine fields of study. Programs of higher education can have a significant economic impact on the Virginia economy through the expenditures made by students on tuition and living expenses, the attraction of external grants, technology and business spinoffs that result from research and development activities, and the increased earnings and productivity of graduates (Rephann, Knapp and Shobe 2009).

Virginia Tech provides a diverse range of higher education equine activities. It offers an equine science program within the Department of Animal and Poultry Sciences that provides preparation for careers in the equine industry. Virginia Tech recently expanded program offerings to the Middleburg Agricultural Research and Extension (MARE) Center, a 420-acre facility in the heart of Northern Virginia's horse country. The Virginia-Maryland Regional College of Veterinary Medicine offers equine veterinary training and care at two facilities in Blacksburg and the Marion duPont Scott Equine Medical Center (EMC) in Leesburg. The DuPont Center is a leading national equine veterinary hospital and research facility with approximately 120 staff dedicated to equine health. In addition, Virginia Tech's Cooperative Extension Service provides horse industry support in the fields of animal agriculture and 4-H youth development as well as operating an agricultural experiment center in Middleberg that conducts cutting edge research and offers innovative equine science programming.

Several other colleges and universities within the state offer competitive credit equine programs. Virginia Intermont College, a private college located in Bristol, awards a bachelor in science in equine studies with concentrations in dressage, eventing and management. It graduated 26 students during the 2007-08 academic year. Another private college, Averett College in Danville, provides a bachelor's degree in equestrian studies. It enrolled 18 students and graduated 1 during the 2007-2008 academic year. Bridgewater College offers a minor in equine studies. Sweet Briar College offers a certificate.

Many of Virginia's remaining colleges and universities offer either individual classes, riding recreational riding programs or clubs for their students such as Hollins University in Roanoke County, James Madison University in Harrisonburg, Liberty University in Lynchburg, Lord Fairfax Community College in Northern Virginia, Lynchburg College, Randolph College in Lynchburg,

Radford University, the University of Richmond, the University of Virginia in Charlottesville, Washington and Lee University in Lexington, and the College of William and Mary in Williamsburg. Many college teams riders compete in horse shows thorough regional competitions held through the Intercollegiate Horse Show Association (IHSA).

REFERENCES

Ali, Mukhtar M. and Richard Thalheimer. 1997. Transportation costs and product demand: Wagering on parimutuel horse racing. *Applied Economics* 29, 4: 529-542.

American Horse Publications. 2010. 2009-2010 AHP equine industry survey summary statistics. http://www.americanhorsepubs.org/resources/AHP-Equine-Survey-Final.pdf

Auditor of Public Accounts, Commonwealth of Virginia. 2010. Comparative report of local government revenues and expenditures, year ended June 30, 2009. Amended Report.

Auditor of Public Accounts, Commonwealth of Virginia. 2009. Comparative report of local government revenues and expenditures, year ended June 30, 2008. Amended Report.

Bahrampour, Tara. 2009. Virginia's vanishing breed: Once famed for great horses, the state is losing large thoroughbred farms. *Washington Post*. May 26, 2009, p. b.1.

Beattie, Bruce R., Trent Teegerstrom, Jorgen Mortensen and Eric Monke. 2001. *A partial economic impact analysis of Arizona's horse industry*. Tucson, AZ: Department of Agricultural and Resource Economics, University of Arizona.

Blackwell, Melanie, Angelos Pagoulatos, Wuyang Hu and Katharine Auchter. 2009. Recreational demand for equestrian trail-riding. *Agricultural and Resource Economics Review* 38, 2: 229-239.

Broadway, R. D, J.J. Molnar, C.A. McCall and R.M. Pendergrass. 1994. *Organization, impacts, and prospects for the breeding and raising of horses in Alabama*. Bulletin Number 623. Alabama Experiment Station, Auburn University.

Burdine, Kenny and Bob Coleman. 2006. Equine enterprise budgets. Lexington, KY: Cooperative Extension Service, University of Kentucky. http://www.ca.uky.edu/cmspubsclass/files/kburdine/useeqbud.pdf

Campbell, Julie A. 2010. *The horse in Virginia: An illustrated history*. Charlottesville, VA: University of Virginia Press.

Cummings Associates. 2004. *Analysis of the data and fundamental economics behind recent trends in the thoroughbred racing industry*. Arlington, MA.

Dadayan, Lucy and Robert B. Ward. 2009. *For the first time, a smaller jackpot: Trends in state revenues from gambling*. Albany, NY: Nelson A. Rockefeller Institute of Government.

Deloitte Consulting, LLP. 2005. *The economic impact of the horse industry on the United States*. American Horse Council.

Deul, N. R. 1999. Land use and zoning issues affecting the horse industry. *Journal of Equine Veterinary Science* 9, 1: 55-55.

Eberly, Eric. 2008. Virginia farm business management livestock budgets. Publication 446-048. Virginia Cooperative Extension, Virginia Tech. http://pubs.ext.vt.edu/446/446-048/446-048.html

Freeborn, Jennifer. 2009. *Hedonic price analysis of the internet recreational market*. Master of Science Thesis. Manhattan, Kansas: Department of Agricultural Economics, College of Agriculture, Kansas State University.

Gamrat, Frank A. and Raymond D. Sauer. 2000. The utility of sport and returns to ownership: Evidence from the thoroughbred market. *Journal of Sports Economics* 1, 3: 219-235.

Gerena, Charles. 2005. Happy trails: Horses are used more for pleasure than business, but they still have a place in fifth district agriculture. Richmond Federal Reserve. *Region Focus* (Winter), p. 36-38.

Gibbs, P. G., W. Moyer and M. T. Martin. 1997. Performance horse ownership and use: A Texas horse industry quality audit report. Proceedings of the Annual Convention of the American Association of Equine Practitioners (AAEP). *AAEP Proceedings* 43: 27-30.

Griffiths, Mark. 1999. Gambling technologies: Prospects for problem gambling. *Journal of Gambling Studies* 15, 3: 265-283.

Hackbert, Peter H. 2008. Knott Country 2008 trail ride. Berea College, Entrepreneurship for the public good program. http://www.knottcountyadventure.com/2008TrailRide-kc.pdf

Hughes, David W., Jean M. Woloshuk, Alison C. Hanham, David J. Workman, David W. Snively, Paul E. Lewis and Thomas E. Walker. *West Virginia equine economic impact study*. Morgantown, WV: West Virginia University Extension Service.

Johnson, Virginia C. and Barbara Crookshanks. 2008. *Virginia horse racing: Triumphs of the turf*. Charleston, SC: The History Press.

Kaneene, John B., Martin Safffell, Don J. Fedewa, Kenneth Gallgher, and H. Michael Chaddock. 1997. The Michigan equine monitoring system. I. Design, implementation and population estimates. *Preventive Veterinary Medicine* 29, 4: 263-275.

Kim, Kyungmi, Zaher Hallab and Matthew Smith. 2008. Tourism economic impacts: The case of equine camping in southern Illinois. In *Advances in Hospitality and Leisure*, Volume 4, Joseph Chen (ed.). Emerald Group Publishing Limited, pp. 245-260.

Kline, Carol and Sally Aungier. 2008. Highlights of the 2008 Virginia equestrian tourism survey results. Virginia Horse Council.

Knapp, John L and Catherine E. Barchers. 2001a. The Virginia Horse Center's economic impact. Charlottesville, VA: Weldon Cooper Center for Public Service, University of Virginia.

Knapp, John L and Catherine E. Barchers. 2001b. Monticello's economic impact on the Charlottesville-Albemarle area. Charlottesville, VA: Weldon Cooper Center for Public Service, University of Virginia.

Knapp, John L. 2005. The Virginia Horse Center' economic impact in 2004: An update of the 2001 study. Charlottesville, VA: Weldon Cooper Center for Public Service, University of Virginia.

Knapp, John L., William M. Shobe and Stephen C. Kulp. 2010. *Virginia local tax rates, 2009*. Charlottesville, VA: University of Virginia, Weldon Cooper Center for Public Service, University of Virginia.

Lawrence, L. A., N. E. Jack and D. S. Meyer, 1997. The economic impact of the Virginia horse industry. In Proceedings of the 15th Equine Nutrition and Physiology Symposium, Fort Worth, Texas, 28th-31st May, pp. 300-305.

Menard, R. Jamey, Kaelin W. Hanks, Burton C. English and Kim L. Jensen. 2010. *Tennessee's equine industry: Overview and estimated economic impacts*. Knoxville, TN: Institute of Agriculture, Department of Agricultural Economics, The University of Tennessee.

Montgomery Soil Conservation District. 2004. *Montgomery County horse study*. Report compiled for the Montgomery County Department of Economic Development

Overdevest, Christine and H. Ken Cordell. 2001a. George Washington National Forest recreation realignment report. U.S. Department of Agriculture, Forest Service, Southern Research Station. http://www.srs.fs.usda.gov/trends/rrrpt.html

Overdevest, Christine and H. Ken Cordell. 2001b. Jefferson National Forest recreation realignment report. U.S. Department of Agriculture, Forest Service, Southern Research Station. http://www.srs.fs.usda.gov/trends/rrrpt.html

Planning Decisions, Inc. 2007. *The economic impact of the equine industry in Maine*. Report for the Maine Harness Racing Promotion Board and the Maine Farm Bureau Horse Council.

Pleasant, Scott and Nancy Currin. 2009. Health care for horses. Publication 406-308. Virginia Cooperative Extension, Virginia Tech. http://pubs.ext.vt.edu/406/406-308/406-308.html

Ready, Richard C., Mark C. Berger and Glenn C. Blomquist. 1998. Measuring amenity benefits from farmland: Hedonic pricing vs. contingent valuation. *Growth and Change* 28, 4: 438-458.

Rephann, Terance J. 2008. *The economic impact of agriculture and forestry on the Commonwealth of Virginia*. Charlottesville, VA: Weldon Cooper Center for Public Service, University of Virginia.

Rephann, Terance J., John L. Knapp and William M. Shobe. 2009. *Study of the economic impact of Virginia higher education*. Charlottesville, VA: Weldon Cooper Center for Public Service, University of Virginia.

Stowe, C. Jill and Kenny Burdine. 2009. Understanding the impact of horse shows and competitions in Kentucky. Agricultural Economics Extension Publication No. 2009-29, Lexington, KY: Department of Agricultural Economics, University of Kentucky.

Swinker, Ann M., Peter R. Tozer, Martin L. Shields and Emily R. Landis. 2003. Pennsylvania's equine industry inventory, basic economic and demographic characteristics. University Park, PA: Department of Dairy and Animal Science, College of Agricultural Sciences, Pennsylvania State University.

Thalheimer, Richard and Mukhtar M. Ali. 1995. The demand for parimutuel horse race wagering and attendance. *Management Science* 41, 1: 129-143.

Thompson, William N., Ricardo Gazel, and Dan Rickman. 1997. Social and legal costs of compulsive gambling. *Gaming Law Review* 1, 1: 81-89.

Tuna, Cari and Justin Scheck. 2010. Strapped states find new virtues in 'vice.' *Wall Street Journal* May 10. http://online.wsj.com/article/SB10001424052748703572504575214382430311578.html

Unwanted Horse Coalition. 2009. 2009 *Unwanted horses survey*. http://www.unwantedhorsecoalition.org/resources/UHC_Survey_07Jul09b.pdf

U.S. Department of Agriculture, Economic Research Service. 2010. *Farm income: Data files*. http://www.ers.usda.gov/data/farmincome/finfidmu.htm

U.S. Department of Agriculture, National Agricultural Statistics Service. 2008. *Virginia equine survey report: 2006*.

U.S. Department of Agriculture, National Agricultural Statistics Service. 2002. *Virginia equine survey report: 2001*.

U.S. Department of Agriculture, National Agricultural Statistics Service. 1999. U.S. equine inventory. http://www.eqgroup.com/Library/EQstats_1999.htm

U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service. 2007. *Baseline reference of equine health management strategies at equine events in six states, 2005*. USDA-APHIS-VS. CEAH. National Animal Health Monitoring System, Fort Collins, CO #N456.0607.

U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service. 2006. *Equine 2005, Part II: Changes in the U.S. equine industry, 1998-2005*. USDA-APHIS-VS, CEAH. Fort Collins, CO #N452-0307.

U.S. Department of Agriculture (USDA), National Agricultural Statistics Service. 2004. *2002 census of agriculture. United States summary and state data*. Volume 1, Geographic Area Series, Part 51. AC-02-A-51

U.S. Department of Agriculture (USDA), National Agricultural Statistics Service. 2009. *2007 census of agriculture. United States summary and state data*. Volume 1, Geographic Area Series, Part 51. AC-07-A-51

Virginia Department of Agriculture and Consumer Services. 2007 *Virginia agricultural statistics bulletin and resource directory*: *2006*. Richmond, VA.

Virginia Racing Commission. 2010. *2009 annual report*.

Watson, Philip, Joshua Wilson, Dawn Thilmany, and Susan Winter. 2007. Determining economic contributions and impacts: What is the difference and why do we care? *Journal of Regional Analysis and Policy* 37, 2: 140-146

The Wessex Group. 1996. *1995 Virginia horse industry profile: Executive summary*. Prepared for Virginia Equine Educational Foundation, Inc.

The Wessex Group. 2003. *2001-2002 study of the economic impact of the equine industry in Virginia*. Prepared for the Virginia Equine Educational Foundation.

Whiting, K., J. J. Molnar, and C.A. McCall 2006. *Alabama equine industry: Inventory, impacts, and prospects*. Bulletin 662. Alabama Agricultural Experiment Station, Auburn University.

APPENDIX A.1
State and Local Tax Computations

The methodology and the description below for computing state and local tax estimates draws heavily on Knapp and Barchers (2001a) for an economic impact study of the Virginia Horse Center. The state and local tax calculations mainly involve state and locality impact estimates derived from IMPLAN to represent tax base impacts (i.e., labor income, value-added and total sales). Estimated average effective tax rates are computed using information on baseline tax bases and tax revenues. Since tax bases are expressed in calendar years and revenues are expressed in fiscal years, tax revenues were computed as averages of the beginning year and end year values for each category of tax revenues. For example, calendar year 2008 revenues are computed based on average revenues for FY 2008 and FY 2009.[1] State and local pari-mutuel taxes are treated separately.

State Taxes

The state government sales and use tax estimates were based on IMPLAN total sales impacts for selected taxable industries (retail trade and selected services).[2] The total sales impact figure includes both the state and local sales taxes. Therefore, the sales tax was removed by multiplying total sales by 0.9524 [=1.00/1.05]. The 1.05 includes the state 4 percent rate and the local 1 percent rate. State sales tax revenue was calculated by multiplying the adjusted sales figure by the state sales tax rate of 4 percent.

State individual income tax collections were based on IMPLAN total labor income impacts. Tax year 2008 year revenue as a percentage of labor income was calculated as 3.69 percent. Labor income impacts in 2010 were multiplied by this rate.

Detailed information on tax bases for other tax categories such as corporate income and motor vehicle fuel consumption were not available from the study or model. Therefore, they were estimated using residual revenues (i.e., total tax collections minus state sales tax collections and individual income tax collections) as a percentage of GDP (gross domestic product) for 2008. Residual tax revenue impacts were calculated by applying this percentage (1.18 percent) to the total value-added impact, which is a measure equivalent to gross domestic product.

The state pari-mutuel licensure tax rate varies depending on such factors as (a) whether the wagering occurred at the racetrack or OTB, (b) whether the wagering was based on live horse racing conducting within the commonwealth or transmitted from elsewhere, and (c) whether the wagering occurred on win, place and show wagering, or exotic bets.[3] The state license tax varies from a high of 2.75 percent of pari-mutuel pools on exotic bets based on live Virginia racing to a low of 0.75 percent on wagering at Virginia OTBs. Information on pari-mutuel state racing license tax revenues was obtained from the Virginia Racing Commission.

Local Taxes

Estimates for local taxes were made for statewide economic impacts as well as each locality. For statewide local tax revenue impacts, statewide average rates were used. However, specific local rates were used to estimate the local tax revenue impacts for each locality.

---

1 Information on the FY 2008 and FY 2009 state budgets was obtained from the Virginia Department of Taxation, Economic outlook and revenue forecast through FY 2012, November 23, 2009. Information on the FY 2009 and FY 2009 local budgets was obtained from the Auditor of Public Accounts, Comparative Report of Local Government Revenues and Expenditures, Year Ended June 30, _____. Reports for 2008 and 2009. Exhibits B and B-2.

2 They included all IMPLAN retail sectors (321-325 and 327-331), hotels and motels and accommodations (410-411), food services and drinking places (413), and automotive repair (414).

3 Code of Virginia §59.1-392 http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+TOC590100000290000000000000

Local option sales tax revenue impact was estimated by applying the local sales tax of 1 percent to total sales impacts for the same selected taxable retail and service sectors used in the state tax analysis above.

Local meals tax estimates were based on total restaurant sales impacts. For the aggregate local revenue estimates based on statewide impacts, the median local meals tax rate (4 percent) was used based on information from the 2009 Virginia Local Tax Rates Study. The median Virginia rate was applied to state restaurant sales impact to compute the aggregate meals tax revenue impact for localities. For each locality estimate, the individual locality state restaurant sales impacts were multiplied by the corresponding locality meals tax rate to obtain local meals tax revenue impacts. In some instances, these rates were zero because the locality does not employ a meals tax.

Local lodgings tax estimates were based on total hotel, motel and other accommodations sales impacts. For the aggregate local revenue estimates based on statewide impacts, the median local lodging tax rate (5 percent) was used based on information from the 2009 Virginia Local Tax Rates Study. The median Virginia rate was applied to the statewide lodgings sales impact estimate to compute the aggregate lodgings tax revenue impact for localities. The individual locality state lodgings sales impacts were multiplied by the corresponding locality lodgings tax rate to obtain local meals tax revenue impacts. In some instances, these rates were zero because the locality does not employ a lodgings tax.

Other local government tax revenues (e.g., property taxes, machinery and tools taxes) were estimated in the same manner as the state. Statewide aggregated other local government revenues were first calculated (e.g., total tax collections minus local options sales tax collections, restaurant sales taxes, and lodging taxes) as a percentage of state GDP in 2008. The statewide aggregated other government tax revenue impacts were calculated by applying the statewide percentage to the total value-added impact from IMPLAN to obtain other local government tax revenues on a state level. For individual localities, local government revenues were calculated as a percent of locality value-added for each locality.[4] The locality's other government tax revenue impact was calculated by applying the locality's percentage to locality total value-added impact to obtain the locality's other local government revenues.

Local pari-mutuel licensure tax rates vary by facility. New Kent County receives one-quarter of Colonial Downs Handle plus one-quarter percent of each OTB's handle for Colonial Downs racing. The handle generated at each Virginia OTB facility on live horse racing within Virginia is subject to a local license tax of 0.25 percent. Virginia local pari-mutuel tax revenue for 2010 was obtained from the Virginia Racing Commission.

4 The locality value-added estimates were obtained from IMPLAN.

Table. A.1 Horse Industry Fiscal Impact Derivation, 2010

Item	Amount ($)
State government	
Sales and use tax (4%)	
Taxable sales--direct, indirect and induced	240,345,527
Adjusted taxable expenditures @ 0.95238095	228,900,501
Tax @ 4%	**9,156,020**
Individual income tax	
Labor income--direct, indirect and induced	502,410,239
Tax at 3.69%	**18,538,938**
Pari-mutuel wagering revenue	**1,866,956**
Other state taxes (corporation income, etc.)	
Value-added--direct, indirect and induced	669,821,036
Other state taxes per dollar of value added (1.18%)	**7,903,888**
Total state taxes	**37,465,802**
Local government[a]	
Local options sales and use tax (1%)	
Taxable Sales--direct, indirect and induced	240,345,527
Adjusted taxable expenditures @ 0.95238095	228,900,501
Tax at 1%	**2,289,005**
Meals tax	
Sales of meals--direct, indirect and induced	60,849,992
Adjusted total sales on meals @ 0.91743119	55,825,681
Tax at 4%	**2,233,027**
Lodgings tax	
Sales of lodging--direct, indirect, and induced	32,891,645
Adjusted total sales on lodging @ 0.90909091	29,901,495
Tax @ 5%	**1,495,07**5
Pari-mutuel wagering revenue	**911,104**
Other local taxes (property, BPOL, etc.)	
Value added	669,821,036
Other local taxes per dollar of value added (3.12%)	**20,898,416**
Total local taxes	**27,826,627**

Source: Center for Economic and Policy Studies, Weldon Cooper Center for Public Service, and Virginia Racing Commission.

a These are statewide estimates for local government. As previously noted, the methodology for individual local governments was different dependent on availability of data.

APPENDIX A.2
Horse Event Inventory

It is important to define what is meant by a show, race and competition for the purpose of constructing the sample. Sometimes the boundaries between show and non-show are blurry. For the purposes of this study, the most significant economic impacts were assumed to be associated with shows that were competitive (usually involving prizes and awards to the top contestants) and open to the general public. Pari-mutuel racing (Thoroughbred racing, Standardred harness racing, and off-track betting) is excluded from this category of expenditures because it is covered under "pari-mutuel racing expenditures." However, other types of races, including steeplechase and endurance rides are included.

The sample includes both sanctioned and unsanctioned shows. Shows could be of national, regional, state or local significance. Schooling shows, which involve judging and competition, are included but clinics and fix-a-test which are primarily instructional activities are not. Youth activities such as 4-H sponsored shows, pony club shows, high school rodeos and therapeutic show activities are included. Most adult games and competitions, including rodeos, barrel racing, Gymkhana and other mounted games are included. However, many local polo contests, hunter-pace and fox-hunts are not captured because participation is more of a social activity that is confined to the membership of local clubs. Trail rides are included if they are competitive or judged contests. The impacts of activities that draw primarily on local attendance should already be captured in the expenditures of horse operations. Sales, auctions and expos such as the annual Equine Extravaganza are not included.

The survey of horse show managers drew on comprehensive database of shows, venues, and managers assembled from multiple sources, including (1) event calendars for three leading Virginia horse industry magazines and websites, *Horse Talk*, *Virginia Equestrian*, and the *Virginia Horse Journal*, (2) event calendars for over 70 different national, state and regional horse event sanctioning organizations (e.g., Virginia Horse Show Association, the Virginia Steeplechase Association), and (3) event calendars posted at websites for horse farms that house stables were examined to see if any horse shows were held at the location. Using these sources, a total of 1,193 horse shows and competitions was identified.

APPENDIX A.3
Survey and Sampling Methodology

About the Survey

The 2010 Virginia Horse Industry Survey was conducted during the summer of 2010 by the Weldon Cooper Center for Public Service's Center for Survey Research (CSR) in cooperation with the Cooper Center's Center for Economics and Policy Studies (CEPS) and by the Virginia Horse Industry Board. The data collection for the project consisted of two phases. First, CSR visited 12 horse events of different types and solicited attendees to fill out surveys with their estimated expenditures and related data for that event. There were 809 completed questionnaires in this "attendee survey." Second, CSR randomly selected 150 horse events for the "manager" portion of the project. CSR mailed questionnaires to the 113 unique managers of these 150 events. The manager survey questionnaire asked for information about attendance, revenues and expenditures for the selected events. Information was collected for 42 events.

The samples were drawn from extensive lists of horse events and facilities compiled by CEPS. The attendee survey was customized into three slightly different versions to fit attendees at show events, pari-mutuel events, and off-track betting (OTB) events. It was administered on-site at the selected events by trained CSR staff. The manager survey mailing packets included a two-page questionnaire, a personalized cover letter explaining the survey request, a supporting letter from the Virginia Horse Industry Board, and a business reply mail envelope. For managers who had multiple events selected for the manager survey, additional survey questionnaires were included in the mailing packet. More details about methods, sampling, mailing dates, survey administration, and response rates are found below.

Survey Methodology

The protocol for the attendee surveys was adapted from CSR's prior experience with face-to-face intercept studies. CSR made advance contact with the on-site managers for the selected events to assess the likely size of the event and to get information about any logistical issues that might impact the data collection process. CSR sent from two to four interviewers per event including an on-site supervisor. The interviewing teams were equipped with name badges, folders, clipboards, questionnaires, CSR business reply envelopes for those who chose to return the surveys later by mail, pens and pencils, work logs, and carry bags.

The teams arrived near the start of the events and made an initial assessment of the best places to conduct the work. Interviewers were instructed to select every nth adult going by a particular spot if there was a large crowd passing by (the value of n was left to the interviewer to adapt to larger or smaller numbers of attendees) or to circulate among the attendees if the crowd was sparse. Ideally, interviewers would be able to keep two to three surveys going at the same time by handing out forms and clipboards to attendees and remaining close by to help if needed, then collect the completed forms. Most of the events had smaller numbers of attendees that allowed the interviewers to essentially saturate the event. Attendees who completed a survey were offered a lapel sticker to help interviewers avoid approaching those people in the future at that event, provide a sense of identity and participation in the survey, and publicize the survey to others at the event.

Interviewers had a suggested script for approaching the attendees, but they were allowed to vary their introductions to fit the situation. All interviewers received approximately two hours of training on the specifics of the study, and all were experienced in telephone survey interviewing techniques from prior experience at CSR. For the manager survey, the protocol was designed to take advantage of the proven principles of Dillman's Tailored

Design Method[1] to enhance response. The questionnaire was intended to be confidential but not anonymous, to allow follow-up with those who had not responded. Each questionnaire included a unique number assigned to the selected event for tracking purposes.

CEPS and CSR staff researched the sampled events to identify the event managers. Surveys were sent to event managers where possible. Surveys were sent to contacts at the facilities for events without good manager contact information.

As is usually done at CSR, modifications to the full Dillman protocol were made to control costs and avoid too many requests of the horse event managers. There was an initial mailing, a generic postcard thank-you/reminder to all managers, a second packet sent only to non-responders, and a telephone reminder call to the remaining non-responders. Early in the process, CSR individually prepared and sent e-mails with attached documents to some cases. This aspect of the protocol was dropped because there were no responses to those e-mails, and it was time-consuming. CSR did use this procedure to accommodate a few managers who specifically requested e-mails later in the project. Additional aspects of the full Dillman protocol such as registered letters to non-responders and personal visits were not part of this study.

The completed surveys from both phases of data collection and other returned mail from the manager survey were recorded in a tracking database. Data collection efforts at CSR were closed on January 4, 2011. The following tables (**Table A.3.1** and **Table A.3.2**) show the sequence of survey tasks.

Table A.3.1 Survey Production Tasks, 2010 Attendee Survey

Task	Event Type	Date
Showday National; Commonwealth Park; Culpeper	Hunter/jumper	July 9, 2010
Arabian Horse Association Region 15; Virginia Horse Center, Lexington	Breed	July 10, 2010
Colonial Downs, Thoroughbred Race Day; New Kent County	Pari-mutuel event	July 21, 2010
AA Horse Show - Deep Run; Deep Run Hunt Club, Manakin-Sabot	Breed/hunter	July 25, 2010
ESSCHSA; In Remembrance Farm; Nassawadox	Show	July 30-31, 2010
Lexington National Horse Show; Virginia Horse Center, Lexington	Hunter/jumper	August 15, 2010
Dressage at Foxcroft; Foxcroft School, Middleburg	Dressage	August 22, 2010
Richmond OTB; West Broad Street, Richmond	OTB	September 3, 2010
Summerplace Farm Horse Show; Summerplace Farm, The Plains	Hunter	September 11, 2010
East Coast Equestrian Center, Virginia Beach	Breed	October 2, 2010
Martinsville OTB; Martinsville	OTB	October 8, 2010
Colonial Downs, Harness Season; New Kent	Pari-mutuel event	October 9, 2010
Final dataset		November 5, 2010

Sample Design

Attendee Survey

The sample for the attendee survey comprised multiple parts. The budget for the project allowed for CSR staff to visit 12 events around the state, some being one-day trips and others involving overnight stays. Those 12 trips

1 See Don A. Dillman, 2000. *Mail and Internet Surveys: The Tailored Design Method.* New York: John Wiley and Sons.

Table A.3.2 Survey Production Tasks, 2010 Manager Survey

Task	Date
First survey packets sent for pilot cases	September 24, 2010
Reminder post cards sent for pilot cases	October 20, 2010
Second survey packets sent for pilot cases	November 2, 2010
First survey packet sent for events with manager addresses	November 2, 2010
Reminder post cards sent for events with manager addresses	November 11, 2010
Second packet sent for events with manager addresses	November 18, 2010
First survey packet sent for events with only facility addresses	November 15, 2010
Reminder post cards sent for events with only facility addresses	November 22, 2010
Second packet sent for events with only facility addresses	November 30, 2010
Re-mailed packets on request from target	December 3, 2010
Re-mailed packet on request from target	December 15, 2010
Telephone reminder calls begin	November 18, 2010
Telephone reminder calls end	January 3, 2011
Close data collection	January 4, 2011
Final dataset	January 4, 2011

needed to be allocated to cover the range of event types across the state. In order to focus the data collection efforts, the sampling was limited to the 374 events on the CEPS event list that had starting dates in July, August or September.

Due to the importance of pari-mutuel events in the calculation of the economic impact of the horse industry, some of the 12 visits needed to be reserved for pari-mutuel events. There is only one pari-mutuel racing facility in Virginia – Colonial Downs in New Kent County. Colonial Downs runs a thoroughbred meet in the summer and a harness meet in the fall. One visit was allocated to each type of meet at Colonial Downs. There are several off-track betting (OTB) facilities in Virginia. To capture the range of impacts at OTB facilities, two visits were reserved for OTB facilities.

The remaining eight visits were allocated to horse shows and events around the state. There is a wide range of event types, sizes and locations that are likely to have different economic impacts. As with many other lists of organizations, businesses and events, there were a few fairly large events and many small events. In addition, events were more likely to be found in the central and northern parts of the state. A simple random sample of events would under-represent large events and events in the western and southeastern areas of Virginia. A sampling plan was developed to ensure broader representation from larger events and events outside the central and northern regions of the state.

Each event was assigned a likely measure of economic impact based on the product of the estimated number of horses at the event and the number of days for which the event lasted. The larger the product of these two terms, the greater the estimated economic impact of the event. This rough index of event size is too crude to inform actual economic impact modeling directly, but it was useful to ensure that the sampled events included both larger and smaller events. Each event was also assigned to a region of the state--Northern, Central, Southeastern or Western. Based on the different numbers of events in each region, the desire to have a minimum of two events per region on which to model economic impacts and the desire to have two extra events sampled to use in case the final research plan reduced the OTB and/or race track visits, there were two events selected from the Central,

Western and Southeastern regions and four events selected from the Northern region. In total, ten events were sampled. The two that were held in reserve were not needed because four trips were allocated to OTB and pari-mutuel events. One of the two events originally selected in the Central region refused to participate. A substitute event was rained out. A third event was selected in this size category but because at that point the schedule was limited, the third substitute was located in the Southeastern region rather than the Central region. The final realized allocation of the eight remaining events is shown in **Table A.3.3**.

Table A.3.3 Sample Design for 2010 Attendee Survey

Frame Description	Frame Size (# of Events)	Sample Size (# of Events)	Completed Surveys (Attendees)
Total events on the CEPS list with start dates in July, August or September	374	8	809
Northern region	155	3	173
Central region	111	1	42
Western region	56	2	283
Southeastern region	52	2	60

Within each region, events were selected using the principles of sampling with probability proportional to size (PPS). In this method, larger events had a greater chance of selection than did smaller events. This roughly balanced the fact that there were many more smaller events than larger events, and that staffing limits would create some maximum number of interviews that could be obtained even at events with attendees numbering in the thousands. A true PPS sampling design creates a two-stage probability sample in which all cases have equal probability of selection, thus avoiding increased statistical variance due to unequal measures of size. Because the attendee survey was not a probability sample, it was not a true PPS sample. But the principles of PPS helped to ensure a random selection method and the inclusion of attendees at larger events.

Overall, the relatively small number of events available to include in the attendee survey meant that this sample was created to maximize diversity across different event types and geography to support a good composite picture of the expenditures of attendees. It was not intended as proportional representation of different event types. Calculation of a response rate or a margin of error is not possible or appropriate with this sample.

Manager Survey

Unlike the attendee sample, the sample for the manager survey was designed as a probability sample. Because the survey would be based on retrospective reporting, the sampling frame could be expanded beyond the summer months used for scheduling the on-site visits for the attendee surveys. The manager sampling frame consisted of 952 events on the CEPS list with starting dates from January through September of 2010. In total, 150 events were sampled using a disproportionate stratified sampling scheme that ensured that enough events in each of four size categories would be included in the sample.

The size categories were assigned by CEPS to roughly characterize the geographical draw of the event based on judgment and knowledge of each event. The size categories, from smallest to largest, were local, statewide, regional and national. The sampling scheme is shown in **Table A.3.4**.

Questionnaire Design

The questionnaire was designed by CEPS and CSR, and was based on a prior questionnaire used in a horse study by CEPS and an intercept questionnaire used by CSR to query visitors to Monticello about travel expenses. Because the questionnaire was based on prior field-tested surveys, it was not piloted. The content of the attendee survey addressed the role of the attendee at the event and the attendee's event-related expenditures in several categories.

Table A.3.4. Sample Design for 2010 Manager Survey

Frame Description	Frame Size (# of Events)	Sample Size (# of Events)	Completed Surveys (# of Events)
Total events on the CEPS list with start dates from June through September	952	150	42
Local draw	801	50	18
Statewide draw	101	50	13
Regional draw	26	26	8
National draw	24	24	3

The topics covered by the questionnaire were:

I. Event information (name, location, date)
II. Type of participant (spectator, rider, owner, etc.) (The OTB survey eliminated this section.)
III. Home location, travel distance, size of the respondent's travel party, time spent traveling
IV. Expenses of the respondent's entire travel party in eight categories broken out by three categories of geographical proximity to the event. (The horse race attendee and OTB surveys added a ninth category for wagering.)
V. If the respondent was a participant, the expenses of the participant for participating in the event in six categories broken out by three categories of geographical proximity to the event. (The OTB survey eliminated this section.)
VI. Respondent demographics

The content of the manager survey was similar.

I. Event information (name, location, date, sanctioning organization)
II. Number of horses entered and people attending the event as spectators, broken out by three categories of geographical proximity to the event.
III. Revenue for the event in six categories
IV. Expenses for the event in nine categories
V. Additional information about revenues from vendors, if applicable
VI. Number of employees for the event
VII. Respondent contact information

Response Rate

The response rate is calculated by dividing the number of completed questionnaires by the number of potential valid respondents in the sample. The attendee survey is by definition a non-probability convenience sample. It is not possible to calculate a response rate for that phase of the project. Anecdotal evidence from the interviewing crews indicates that at many events they were able to approach almost every attendee.

The manager survey was a probability sample. Therefore it is appropriate to calculate a response rate. However, the calculation is complicated by the fact that the sampling was performed at the level of events, but the same individual could have managed more than one of the sampled events. In fact, there were 113 unique individuals listed as the contact people for the 150 sampled events. Furthermore, some of the contact information was changed as CSR and CEPS received new information about which the survey request should be addressed to. Therefore, calculating a response rates among unique individual contacts is difficult. The numbers here are calculated at the level of events. The response rate or coverage rate for the 150 sampled events was 29 percent, after estimating the likely number of canceled events in line with *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys* (AAPOR, 2006). See **Table A.3.5**.

Table A.3.5. 2010 Manager Survey Response Rate

Events	Count	Response Rate Overall	Qualified/ Reachable	Adjusted Count	Response Rate Adjusted
Complete	42	27.3%	28.8%	42	29.2%
Refusal	25	16.7%	17.1%	25	17.4%
Undeliverable mail	7	4.7%	4.8%	7	4.9%
Requested another survey, no completion	6	4.0%	4.1%	6	4.2%
New information received, no completion	25	16.7%	17.1%	25	17.4%
Event canceled (ineligible)	4	2.7%	--	--	--
Open status	41	27.3%	28.1%	39	27.1%
Total	150	100.0%	100.0%	144	100.0%

APPENDIX A.4
Event Managers Survey

UVA Institutional Review Board #2010-0253-00

WELDON COOPER CENTER FOR PUBLIC SERVICE
University of Virginia

HORSE EVENT SURVEY

This survey is being conducted as part of a study to measure the impact of the horse industry on the economy of Virginia. The study is being sponsored by the Virginia Horse Industry Board (VHIB). Participation is voluntary, but your cooperation in this effort will be extremely valuable to the industry's future. The survey should take approximately 10 minutes to complete. **All information that you provide will be kept strictly confidential**. Thank you for your participation.

1. How many equids were registered for this event? Enter number: _____
   Please indicate:
   a. Percent local (owner lived within 15 miles of event venue) _____ %
   b. Percent non-local, but Virginia residence _____ %
   c. Percent out-of-state (owner lived outside of Virginia) _____ %
   Total 100 %

2. How many other people attended the event as spectators? Please count each person only once, even if they were there on several days: _____
   Please indicate:
   a. Percent local (attendee lived within 15 miles of event venue) _____%
   b. Percent non-local, but Virginia residence _____%
   c. Percent non-state (attendee lived outside of Virginia) _____%
   Total 100 %

3. Please list any sanctioning organization(s) for the event: _____

4. Please indicate your revenue from this event from the following sources:
   a. Admissions, parking and programs $ _____
   b. Sponsors and advertising $ _____
   c. Entry, registration, and showing fees $ _____
   d. Stall rentals $ _____
   e. Your income from concessions and vending $ _____
   f. Other revenue $ _____
   (Please describe _____)

Please see reverse side for more questions

5. Please indicate your expenses for this event for the following categories:

Operating expenses

a. Cash prizes, trophies, and awards $ _____
b. Maintenance of facilities $ _____
c. Rental of equipment, vehicle, and facility $ _____
d. Salaries, wages and benefits paid $ _____
e. Donations to charity $ _____
f. Other expenses (e.g., office supplies, insurance) $ _____
(Please describe _____)

Taxes

a. Federal taxes (e.g., payroll tax) $ _____
b. State taxes (e.g., sales tax) $ _____
c. Local taxes (e.g., admissions tax) $ _____

6. What is your home zip code? _____

7. Did you have an area where vendors could sell and display?
1. Yes
2. No

8. How many vendors sold concessions or merchandise at the event? Enter number: _____
Please estimate:
a. Percent local (live within 15 miles) _____ %
b. Percent non-local, but Virginia residence _____ %
c. Percent out-of-state _____ %
Total 100 %

9. How many employees were on your payroll for the event? Enter number: _____
Please estimate:
a. Percent local (live within 15 miles) _____ %
b. Percent non-local, but Virginia residence _____ %
c. Percent out-of-state _____ %
Total 100%

10. Please complete the contact information below so that we may contact you if we have questions about your survey.

Name: _____
Title: _____
Address: _____
_____
E-mail: _____
Phone: _____

❑ Please check here if you would like a Virginia Horse Industry Impact Study summary report.

Thank you for taking the time to complete this survey. If you have any questions about the survey, please contact Terry Rephann at the Weldon Cooper Center for Public Service, P.O. Box 400206 Charlottesville, VA 22904-4206. Phone (434)-982-4501. Fax (434) 982-5536. e-mail: trephann@virginia.edu.

APPENDIX A.5
Event Attendance Surveys

UVA Institutional Review Board # 2010-0253-00

WELDON COOPER CENTER FOR PUBLIC SERVICE
University of Virginia

HORSE EVENT ATTENDANCE SURVEY

This survey is being conducted as part of a study to measure the impact of the horse industry on the economy of Virginia. The study is being sponsored by the Virginia Horse Industry Board (VHIB). Participation is voluntary, but your cooperation in this effort will be extremely valuable to the industry's future. The survey should take approximately 10 minutes to complete. **All information that you provide will be kept strictly confidential**. Thank you for your participation.

1. I participated as:
   - ❑ Spectator
   - ❑ Horse Rider or Owner (Name of Horse(s) _____)
   - ❑ Horse Trainer (Name of Horse(s) _____)
   - ❑ Paid Staff/Management
   - ❑ Volunteer Staff
   - ❑ Other (please specify _____).

2. What is your home zip code? _____

3. Did you travel to this area specifically for this event?

   1. Yes
   2. No

4. How many people, including yourself, are in your immediate travel party? _____

5. If you are not a local resident, how many days will you stay:
   a. In the local area (defined as the area within 15 miles of the event)? _____

   If you are not a Virginia resident, how many days will you stay:
   b. In Virginia but outside the local area? _____

6. Thinking about what you've spent so far and what you think you'll spend for the rest of your visit, what are **your travel party's total expected expenses** for this trip for the following categories (please count all your spending by cash, checks, credit or debit card. If you don't know for sure, give your best estimate rather than leaving it blank.)?

Category I	(1) At this event	(2) In the local area but outside the event	(3) In Virginia but outside the local area on the way to and from this event
a. Spectator admission fees, parking, and program	$ _____		
b. Food and drink	$ _____	$ _____	$ _____
c. Lodging (hotels, motels, campsites)	$ _____	$ _____	$ _____
d. Entertainment	$ _____	$ _____	$ _____
e. Gifts, souvenirs, clothing, etc.	$ _____	$ _____	$ _____
f. Travel (gas, tolls, fares)		$ _____	$ _____
g. Car rental		$ _____	$ _____
h. Other (Please describe _____)	$ _____	$ _____	$ _____

Please see reverse side for more questions

Horse show participant (rider, owner, or trainer) only:

Category II	(1) At this event	(2) In the local area but outside the event	(3) In Virginia but outside the local area on the way to and from this event
a. Entry, registration, showing fees	$ _____		
b. Stall or boarding fees	$ _____	$ _____	$ _____
c. Feed and bedding	$ _____	$ _____	$ _____
d. Horse care services (e.g., farrier, veterinary, grooming)	$ _____	$ _____	$ _____
e. Tack and horse supplies	$ _____	$ _____	$ _____
f. Other, horse related expenses Please describe (_____)	$ _____	$ _____	$ _____

7. If you paid someone to transport your horse to or from this event,

   a. how much did it cost? $ _____

   b. Is the company located in Virginia?
      1. Yes
      2. No

   c. Is the company located in the local area?
      1. Yes
      2. No

8. Age group:
   1. Under 25 years old
   2. 25-44 years old
   3. 45-64 years old
   4. 65 years old or older

9. Education level:
   1. Some high school or less
   2. High school graduate
   3. Some college or trade school
   4. Bachelor's degree
   5. Some graduate or graduate degree

10. Gender:
    1. Male
    2. Female

Thank you for taking the time to complete this survey. If you have any questions about the survey, please contact Terry Rephann at the Weldon Cooper Center for Public Service, P.O. Box 400206 Charlottesville, VA 22904-4206. Phone (434)-982-4501. Fax (434) 982-5536. e-mail: trephann@virginia.edu.

CSR
Center for Survey Research • University of Virginia
A Unit of the Weldon Cooper Center for Public Service

UVA Institutional Review Board #2010-0253-00

WELDON COOPER CENTER FOR PUBLIC SERVICE
University of Virginia

HORSE RACE ATTENDANCE SURVEY

This survey is being conducted as part of a study to measure the impact of the horse industry on the economy of Virginia. The study is being sponsored by the Virginia Horse Industry Board (VHIB). Participation is voluntary, but your cooperation in this effort will be extremely valuable to the industry's future. The survey should take approximately 10 minutes to complete. All information that you provide will be kept strictly confidential. Thank you for your participation.

1. I participated as:
   - ❑ Spectator
   - ❑ Horse Rider or Owner (Name of Horse(s) _____)
   - ❑ Horse Trainer (Name of Horse(s) _____)
   - ❑ Paid Staff/Management
   - ❑ Volunteer Staff
   - ❑ Other (please specify _____).

2. What is your home zip code? _____

3. Did you travel to this area specifically for the racing? 1. Yes 2. No

4. How many people, including yourself, are in your immediate travel party? _____

5. If you are not a local resident, how many days will you stay:
   a. In the local area (defined as the area within 15 miles of the race track)? _____

   If you are not a Virginia resident, how many days will you stay:
   b. In Virginia but outside the local area? _____

6. Thinking about what you've spent so far and what you think you'll spend for the rest of your visit, what are **your travel party's total expected expenses** for this trip for the following categories (please count all your spending by cash, checks, credit or debit card. If you don't know for sure, give your best estimate rather than leaving it blank.)?

Category I	(1) At this track	(2) In the local area but outside the track	(3) In Virginia but outside the local area on the way to and from this track
a. Wagers	$ _____		
b. Spectator admission fees, parking, and program	$ _____		
c. Food and drink	$ _____	$ _____	$ _____
d. Lodging (hotels, motels, campsites)		$ _____	$ _____
e. Entertainment	$ _____	$ _____	$ _____
f. Gifts, souvenirs, clothing, etc.	$ _____	$ _____	$ _____
g. Travel (gas, tolls, fares)		$ _____	$ _____
h. Car rental		$ _____	$ _____
i. Other (Please describe _____)	$ _____	$ _____	$ _____

Please see reverse side for more questions

Horse show participant (rider, owner, or trainer) only:

Category II	(1) At this track	(2) In the local area but outside the track	(3) In Virginia but outside the local area on the way to and from this track
a. Entry, registration, showing fees	$		
b. Stall or boarding fees	$	$	$
c. Feed and bedding	$	$	$
d. Horse care services (e.g., farrier, veterinary, grooming)	$	$	$
e. Tack and horse supplies	$	$	$
f. Other, horse related expenses Please describe (_____)	$	$	$

7. If you paid someone to transport your horse to or from this race track,

   a. how much did it cost? $ _____

   b. Is the company located in Virginia?
      1. Yes
      2. No

   c. Is the company located in the local area?
      1. Yes
      2. No

8. Your age:
   1. Under 25 years old
   2. 25-44 years old
   3. 45-64 years old
   4. 65 years old or older

9. Your education:
   1. Some high school or less
   2. High school graduate
   3. Some college or trade school
   4. Bachelor's degree
   5. Some graduate or graduate degree

10. Your gender:
    1. Male
    2. Female

Thank you for taking the time to complete this survey. If you have any questions about the survey, please contact Terry Rephann at the Weldon Cooper Center for Public Service, P.O. Box 400206 Charlottesville, VA 22904-4206. Phone (434)-982-4501. Fax (434) 982-5536. e-mail: trephann@virginia.edu.

CSR
Center for Survey Research • University of Virginia
A Unit of the Weldon Cooper Center for Public Service

WELDON COOPER CENTER FOR PUBLIC SERVICE
University of Virginia

OFF TRACK BETTING PARLOR ATTENDANCE SURVEY

This survey is being conducted as part of a study to measure the impact of the horse industry on the economy of Virginia. The study is being sponsored by the Virginia Horse Industry Board (VHIB). Participation is voluntary, but your cooperation in this effort will be extremely valuable to the industry's future. The survey should take approximately 10 minutes to complete. **All information that you provide will be kept strictly confidential**. Thank you for your participation.

1. What is your home zip code? _____

2. Did you travel to this area specifically to visit this off-track betting parlor (OTB)?

   1. Yes
   2. No

3. How many people, including yourself, are in your immediate travel party? _____

4. If you are not a local resident, how many days will you stay:
   a. In the local area (defined as the area within 15 miles of the OTB)? _____

   If you are not a Virginia resident, how many days will you stay:
   b. In Virginia but outside the local area? _____

5. Thinking about what you've spent so far and what you think you'll spend for the rest of your visit, what are **your travel party's total expected expenses** for this trip for the following categories (please count all your spending by cash, checks, credit or debit card. If you don't know for sure, give your best estimate rather than leaving it blank.)?

Category I	(1) At this OTB	(2) In the local area but outside the OTB	(3) In Virginia but outside the local area on the way to and from this OTB
a. Wagers	$ _____		
b. Spectator dmission fees, parking, and program	$ _____		
c. Food and drink	$ _____	$ _____	$ _____
d. Lodging (hotels, motels, campsites)		$ _____	$ _____
e. Entertainment	$ _____	$ _____	$ _____
f. Gifts, souvenirs, clothing, etc.	$ _____	$ _____	$ _____
g. Travel (gas, tolls, fares)		$ _____	$ _____
h. Car rental		$ _____	$ _____
i. Other (Please describe _____)	$ _____	$ _____	$ _____

Please see reverse side for more questions

6. Age group:

    1. Under 25 years old
    2. 25-44 years old
    3. 45-64 years old
    4. 65 years old or older

7. Education level:

    1. Some high school or less
    2. High school graduate
    3. Some college or trade school
    4. Bachelor's degree
    5. Some graduate or graduate degree

8. Gender:

    1. Male
    2. Female

Thank you for taking the time to complete this survey. If you have any questions about the survey, please contact Terry Rephann at the Weldon Cooper Center for Public Service, P.O. Box 400206 Charlottesville, VA 22904-4206. Phone (434)-982-4501. Fax (434) 982-5536. e-mail: trephann@virginia.edu.

CSR
Center for Survey Research • University of Virginia
A Unit of the Weldon Cooper Center for Public Service

GLOSSARY OF TERMS

Breed. A relatively homogenous group of horses with distinguishing characteristics such as disposition, conformation, color or performance ability (e.g., gait, speed).

Combined test. A competition that features of any two of the three activities that are part of eventing: dressage, jumping or cross-country.

Cross country. A timed endurance competition in which horse and rider are judged on their jumping performance for obstacles erected through pastures and woods.

Cutting. A western competition in which the rider must separate a cow from a herd and keep it from returning to the herd.

Direct effects. Expenditures made by the horse industry on goods and services. These expenditures include the expenditures of horse operations, expenditures of participants and spectators at horse shows and competitions, and expenditures of participants, bettors and spectators at pari-mutuel effects. For example, $100 spent by a horse owner on local hay would be a direct expenditure.

Dressage. An English competition in which horse and rider perform a series of increasingly complex maneuvers, including trots, lateral movements and circles in a ring without obstacles.

Driving. An activity involving horse drawn carriages, wagons or carts.

Endurance riding. A long distance race of typically 25, 50 or 100 miles in length in which horses are judged on speed and fitness.

English riding. A style of horseback riding derived from traditions of English hunting, training and competition. English disciplines include: hunting, jumping, cross-country and dressage.

Equine. Of or relating to horses, ponies, mules, donkeys or burros.

Eventing. A horse show that features dressage, jumping and cross-country. Each activity is scheduled on a different day. This practice is also known as three-day eventing.

Fix-a-test clinic. A judged dressage test in which student riders are provided instructional assistance and given an opportunity to repeat or "fix" previous errors.

Gymkhana. A mounted game that involves a series of timed equestrian contests such as barrel racing, pole bending, egg and spoon races, sack races and mounting/dismounting exercises.

Handle. The total amount wagered in a pari-mutuel activity.

Harness racing. A form of horse racing in which horses pull a driver in a two-wheeled cart.

Horse trial. A competition that features eventing activities (dressage, jumping, and cross-country) but is held in one day.

Hunter. An un-timed English competition in which horse and rider are evaluated for their "hunting" ability. The horse is judged on its disposition, appearance and its balance, rhythm, and movement through a course of obstacles no higher than four feet and three inches that are similar to what might be found in a hunting field, like gates, fences, and walls and hedges. The rider is judged for his/her appearance, style, and riding ability.

IMPLAN (IMpact analysis for PLANning). A personal computer-based regional economic modeling system for input-output analysis produced by MIG, Inc.

Indirect effects. The economic impact arising from the cumulative effects of inter-industry purchases. For example, state businesses provide supplies and services to the horse industry such as bedding and feed, veterinarian services, utilities and insurance. These businesses purchase a portion of their supplies and services from other local and state firms who, in turn, purchase a portion of their supplies and services from other local and state firms. This cascading sequence of spending continues until the subsequent rounds of spending dissipate. For example, farmers who produce hay must purchase string to bale the hay and string manufacturers must purchase the materials to produce the string, and so on.

Induced effects. The economic impact arising from the cumulative effects of household spending. This impact arises because businesses pay households for their labor services. These households then purchase goods and services from local and state firms who in turn purchase a portion of their labor and material inputs from other local and state firms, and so forth. For example, farmers will spend their farm income on goods and services provided by local businesses such as laundry and cleaning supplies. The supply retailer will in turn pay workers and purchase laundry and cleaning supplies from manufacturers, and so on.

Jumper. A timed English competition in which horse and rider are judged on their jumping performance for obstacles erected over a course. Jumpers feature wider and higher obstacles and more difficult turns, than hunters. Also known as stadium jumping.

Labor income. Income derived from employment. It is the sum of employee compensation and propietor income.

Pari-mutuel. A form of betting in which the bettors divide the total amount of wagers minus a take-out portion for management and taxes based on the sums they wagered and their choice of winner.

Pleasure riding. A western or English competition on a flat course in which horses are judged on obedience, performance and style.

Purse. The total prize money awarded in a race.

Racino. A combination racetrack and casino, the latter of which usually offers only slots.

Reining. An western competition in which horse and rider perform a series of complex maneuvers, including circles, sliding stop, backups and spins in a ring without obstacles.

Rodeo. A western style competition that tests the ability and speed of riders in traditional cowboy skills including roping, barrel racing, steer wrestling, goat tying, bareback riding, bronco riding and bull riding.

Schooling show. A “practice” show for beginning riders and more advanced riders riding green horses.

Simulcasting. Live audio/visual feeds of horse races: inter-track wagers (ITW) and off-track betting (OTB).

Steeplechase. A form of competitive horse racing over a distance course in which a variety of natural and man-made obstacles are erected.

Take out. Portion of wager pool withheld for racetrack (commission), horse winners (purses), and state and local taxes.

Team penning. A timed western competition in which a team of three horses and riders must separate three cattle from a herd and direct them into a pen.

Total industry output/sales. The total value of goods and services produced in the economy for intermediate use (i.e., inputs to produce other inputs or goods for final demand) and final demand. This measure of output is much larger than gross domestic product/value-added.

Trail class. A western competition in which riders navigate an obstacle course designed to simulate a trail that would occur in the natural habitat. This is a judged trail ride.

Value added. The value of goods and services produced in the economy for final demand. Value-added is calculated by subtracting the values of intermediate purchases from the value of products sold for final demand. It is equivalent (minus capital depreciation expenses) to the sum of employee compensation, proprietary income, other property type income (e.g., rents, interest, dividends and undistributed profits) and indirect business taxes (i.e., sales and excise taxes). The value-added concept is measured by gross domestic product.

Vaulting. A judged competition in which participants perform gymnastic feats on the backs of horses.

Western riding. A style of horseback riding derived from traditions of western ranching and American cowboys. Western disciplines include: trail, reining, cutting and team penning.